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SERVICE PARTS MANUAL

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SERVICE/PARTS MANUAL

800

GLIDESLOPE

MARKER BEACON

This manual, divided into two parts, contains recommended service information and illustrated parts breakdown applicable to the Cessna 800 Glideslope/Marker Beacon Receiver. Part I contains information relative to the 20 channel receiver and Part II covers the 40 channel receiver. This information is supplemental and kept current by Service Letters and Service News Letters published by Cessna Aircraft Company. Recommended replacement parts for the Cessna 800 Glideslope/Marker Beacon Receiver are available through the Cessna Dealers' Organization.

This Service/Parts Manual Supersedes D640-13 dated November 1968.

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Service Letters along with Memo's and/or Bulletins provide instructions for making modification changes to units in service.

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REFERENCE DATA	DATE	TITLE	INCORPORATED DATE
Bulletin No. KGM690-3	September 1970	Glideslope Needle Oscillation	October 1972

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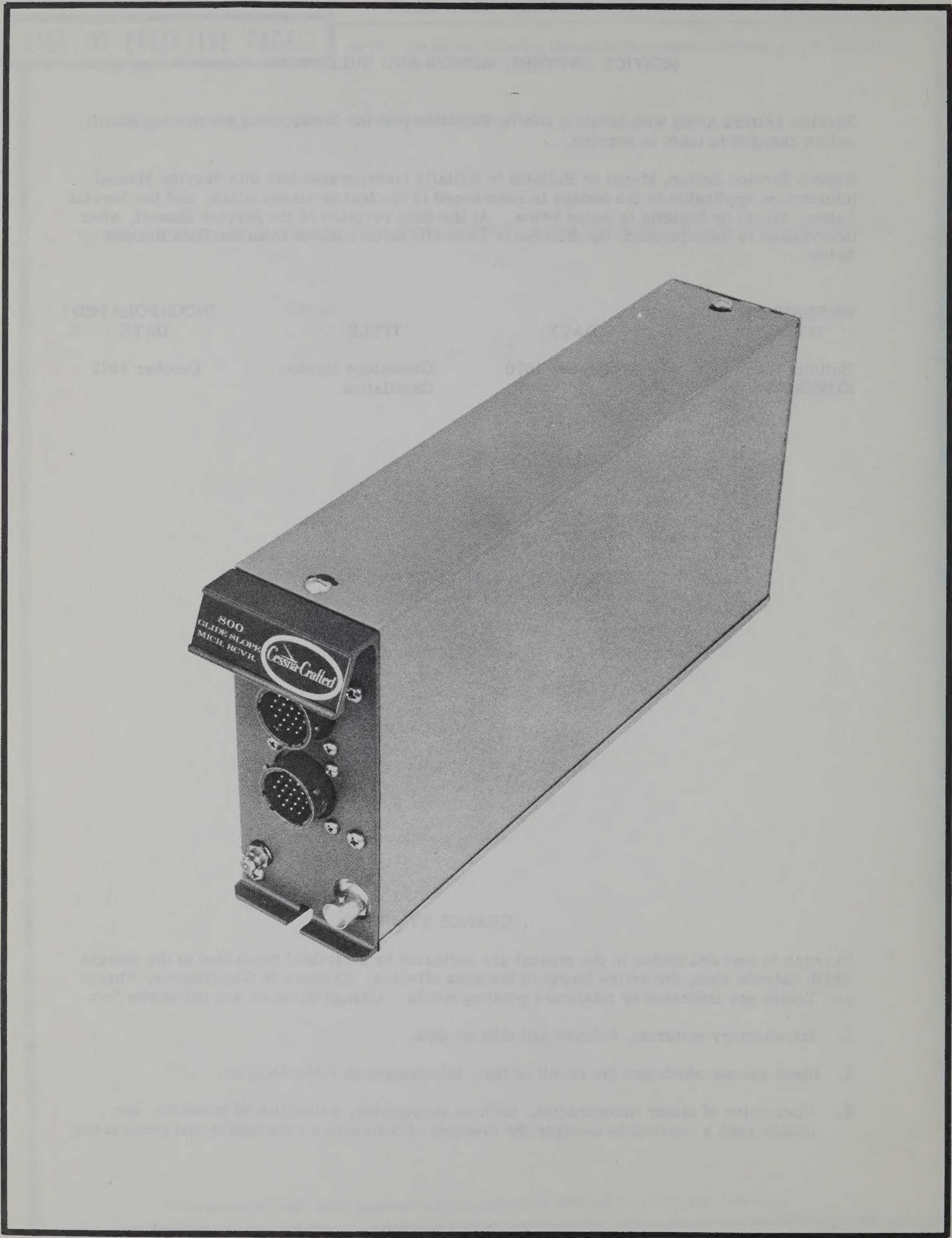


Cessna 800 Glideslope/Marker Beacon Receiver

PART I

20 CHANNEL

CONTENTS

CONTENTS (Continued)

ILLUSTRATIONS

TABLES

SECTION I
GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains information relative to the physical, mechanical, and electrical characteristics of the Cessna 800 Glideslope/Marker Beacon Receiver. Detailed installation, adjustment, and alignment procedures are also included. To facilitate the procurement of replacement parts an alpha-numerical parts list is provided.

1.2 PURPOSE OF EQUIPMENT

The Cessna 800 Glideslope/Marker Beacon Receiver, shown in figure 1-1, when used in conjunction with a Cessna 800 Nav, is designed to provide the pilot vertical steering information (glideslope) during instrument landings and indicates the passage over beacon stations (marker beacon) located on airways or ILS approach courses.

1.3 GENERAL DESCRIPTION

The Cessna 800 Glideslope/Marker Beacon Receiver consists of a Glideslope Receiver and a Marker Beacon Receiver enclosed in a standard general aircraft case. Connections to the Cessna 800 Glideslope/Marker Beacon Receiver are made through two standard MS type connectors on the front panel. The unit may be mounted in any position and shock mounting is not required. Electrically, the Cessna 800 Glideslope/Marker Beacon Receiver consists of two units, glideslope receiver and marker beacon receiver. The units are completely solid state. The glideslope receiver provides 20 crystal controlled channels. The unit has no moving parts thus assuring trouble free operation. The glideslope receiver is capable of operating four 1,000 ohm flag loads and at least five 1,000 ohm meter loads. The marker beacon receiver employs a superheterodyne, crystal controlled, design. The unit has no moving parts thus assuring trouble free operation.

1.4 TECHNICAL CHARACTERISTICS

A technical summary of the Cessna 800 Glideslope/Marker Beacon Receiver is provided in Table 1-1.

Table 1-1 Cessna 800 Glideslope/Marker Beacon Receiver Technical Characteristics

SPECIFICATION	CHARACTERISTIC
Glideslope Receiver	
TSO COMPLIANCE:	TSO C34b Env. Cat. AAAAAAX.
WEIGHT:	3.25 lbs. (Mounting and connectors included). 2.94 lbs. (Unit only).
PHYSICAL DIMENSIONS:	Width: 2.25 inches. Height: 5.0 inches. Depth: 11.25 inches.

Table 1-1 Cessna 800 Glideslope/Marker Beacon Receiver Technical Characteristics (Cont.)

SPECIFICATION	CHARACTERISTIC
Glideslope Receiver	
MOUNTING:	Rigid, any position.
POWER REQUIREMENTS:	27.5 Volts dc, ±20% at 0.375A.
CONTROL:	Remote.
DUTY CYCLE:	Continuous.
INPUT IMPEDANCE:	Designed to match 50 ohm antenna.
DESIGN:	All solid state. No moving parts. No field alignment required.
FREQUENCY RANGE:	329.3MHz to 335.0MHz, 20 channel 2 out of 5 tuning.
SENSITIVITY:	20μv to produce 60% of standard deflection with no more than ±5% erratic movement of needle.
SELECTIVITY:	Less than 6db variation when frequency is varied ±60KHz. Less than 60db variation when frequency is varied over the range of from 250KHz either side of center to and over the range from 328.77MHz to 335.53MHz (excluding the range from ±250KHz of frequency).
AGC CHARACTERISTICS:	Not more than +5% or -15% deviation indicator change from that of standard deflection signal deviation when rf is varied from 700μv to 14,000μv. Indicator shall not deviate more than 5% of standard deflection with a centering signal, nor more than 15% of standard deflection when subjected to environmental changes.
SPURIOUS RESPONSE:	All responses in the band from 90KHz to 1.5KMHz down more than 60db, excluding the band from 328.77MHz to 335.53MHz.
CROSS MODULATION:	Not more than 10% deflection movement due to cross modulation of 20,000μv undesired signal.
FLAG ALARM:	In full view when 90 and/or 150Hz modulation is removed and/or rf input is removed. Begin to appear when modulation is reduced to 22.5%. Capable of operating four 1,000 ohm flag loads.
DEVIATION INDICATOR:	Capable of operating at least five 1,000 ohm meter loads. A standard deviation signal shall produce 78μa in each movement.

Table 1-1 Cessna 800 Glideslope/Marker Beacon Receiver Technical Characteristics (Cont.)

SPECIFICATION	CHARACTERISTIC
	Marker Beacon Receiver
TSO COMPLIANCE:	TSO C35c Env. Cat. AAAAAAX.
WEIGHT:	2. 50 lbs. (Mounting and connectors included). 2. 19 lbs. (Unit only).
PHYSICAL DIMENSIONS:	Width: 2. 25 inches. Height: 5. 0 inches. Depth: 11. 25 inches.
MOUNTING:	Rigid, any position.
POWER REQUIREMENTS:	27. 5 Volts dc: 150ma with lamps not illuminated. 300ma with lamps illuminated.
CONTROL:	Remote.
DUTY CYCLE:	Continuous.
INPUT IMPEDANCE:	Designed to match 50 ohm antenna.
OUTPUT:	7. 75 Volts RMS into 600 ohms.
DESIGN:	All solid state. No moving parts. Point to point wiring. Maintenance free.
FREQUENCY RANGE:	75MHz ±0. 005%.
SENSITIVITY:	Low: 2, 000μv for light threshold. High: 200μv for light threshold.
LOW SENSITIVITY ADJUSTMENT:	200μv to 10, 000μv for light threshold.
SELECTIVITY:	6db at 60KHz. 60db at 600KHz.
AGC CHARACTERISTICS:	The audio output level shall not vary more than 10db when the rf level is varied from threshold to 200, 000μv.
CROSS MODULATION:	With the Marker Beacon Receiver sensitivity adjusted for 2, 000μv, Marker Beacon Receiver is free of cross modulation effects when a 2, 000μv modulated 75MHz signal is applied simultaneously with: a. A 3. 5 Volt simulated TV signal, channels 2 through 6, or b. A 0. 5 Volt FM signal with a ±15KHz deviation over the frequency range of 72. 02 to 74. 58MHz and 75. 42 to 75. 98 MHz.

Table 1-1 Cessna 800 Glideslope/Marker Beacon Receiver Technical Characteristics (Cont.)

SPECIFICATION	CHARACTERISTIC
Marker Beacon Receiver	
SPURIOUS RESPONSE:	With the Marker Beacon Receiver sensitivity adjusted for 2,000μv, the lamp voltage does not exceed lamp operate threshold and the audio output does not exceed one half rated output when the following signals are applied: a. A 0.5 Volt AM signal modulated 30% from 0.190 to 150MHz excluding the band 65MHz to 85MHz. b. A 0.5 Volt FM signal with a ±15KHz deviation from 72.02 to 74.58MHz, or c. A 3.5 Volt simulated TV signal is applied at TV channels 2 through 6.
Cessna 800 Glideslope/Marker Beacon Receiver	
TSO COMPLIANCE:	Meets TSO C35c and C34b Cat. AAAAAAX.
PHYSICAL DIMENSIONS:	Width: 2.25 inches. Height: 5.0 inches. Depth: 11.25 inches.
MOUNTING:	Rigid, any position.
WEIGHT:	4.25 lbs. (Mounting and connectors included). 3.90 lbs. (Unit only).
POWER REQUIREMENTS:	27.5 Volts dc: 0.53ma Marker idle. 0.68ma Lamps illuminated.
INDICATOR LAMPS:	The indicator lamps must be G. E. type 345 or G. E. type 47. Equivalent lamps may be employed. Two sets of lamps can be used.

SECTION II

INSTALLATION

2.1 GENERAL

Installation of the Cessna 800 Glideslope/Marker Beacon Receiver will conform to standards designated by the installing agency and customer as to unit location and type of installation. This section contains suggestions and factors to consider before installing the Cessna 800 Glideslope/Marker Beacon Receiver. Close adherence to these suggestions will assure a more satisfactory performance from the equipment.

2.2 UNPACKING AND INSPECTING EQUIPMENT

Exercise extreme care when unpacking the unit. Make a visual inspection of the unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim. The claim should be promptly filed with the transportation company. When all equipment has been removed, place in the shipping container all packing, bracing, and filler used in the original packing. Save the packing materials for use in unit storage or reshipment.

2.3 INSTALLATION

a. Select the Cessna 800 Glideslope/Marker Beacon Receiver location. The unit may be mounted rigid. Allow one inch free air space around top and rear and one-half inch along each side of the unit.

NOTE

Allot adequate space for installation of cables and connectors.

b. Refer to figure 2-1 for the Cessna 800 Glideslope/Marker Beacon Receiver mounting dimensions.

c. Mark, punch, and drill the mounting holes. Care must be taken to avoid damage to adjacent equipment or cables.

d. Using four #6-32 screws and the holes drilled in step c., secure the mounting rack (071-4004-00) firmly in place.

e. The installing agency will supply and fabricate all external cables. The plugs required are supplied with the Cessna 800 Glideslope/Marker Beacon Receiver.

f. The length and routing of the external cables must be carefully studied and planned before attempting actual installation. Avoid sharp bends and placing the cable near the aircraft control cables.

NOTE

The Cessna 800 Glideslope/Marker Beacon Receiver is shipped from the factory wired for one glideslope meter movement and warning flag. If more than one glideslope meter is desired, remove one resistor (R415, R416, R417, and R418) for each additional glideslope meter movement. Also remove one resistor (R419, R421, and R422) for each additional flag desired.

g. The marker beacon indicator light employed should have six (6) volt, 200ma lamps.

h. Fabricate the external cables in accordance with figure 2-2 (sheet 1) if a Cessna 800 Nav is used or figure 2-2 (sheet 2) if the Cessna 800 Marker Beacon and DME is used. Refer to figure 2-3 to become familiar with the pin locations on the plugs and antenna connector assembly before wiring is started.

NOTE

It is recommended that a continuity check be made on the cable to eliminate possible troubles thus avoiding equipment damage.

i. Connect the external cables to the Cessna 800 Glideslope/Marker Beacon Receiver and associated equipment as shown in figure 2-2 (sheet 1 and 2).

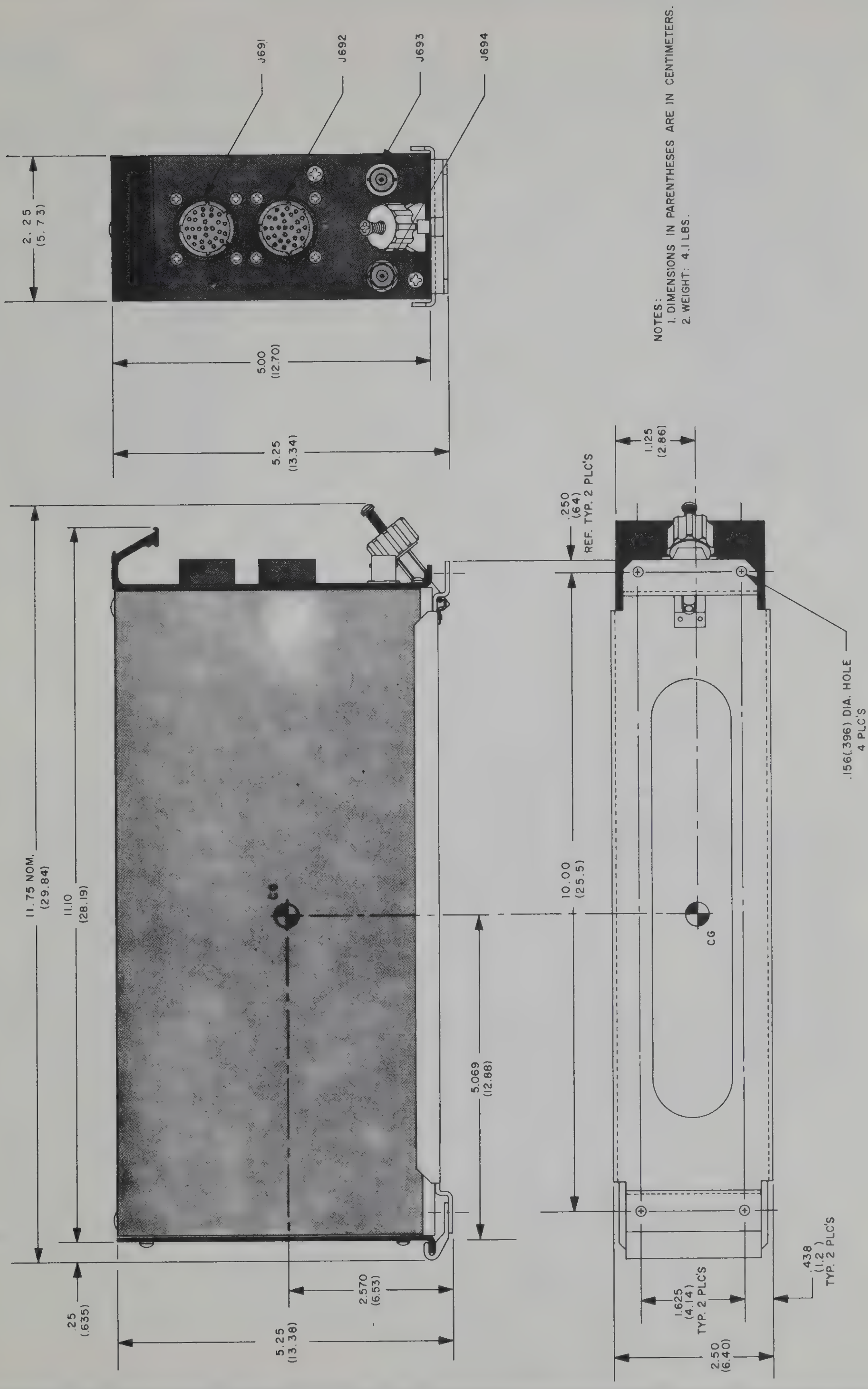


Figure 2-1. Cessna 800 Glideslope/Marker Beacon Receiver Outline and Mounting Dimensions

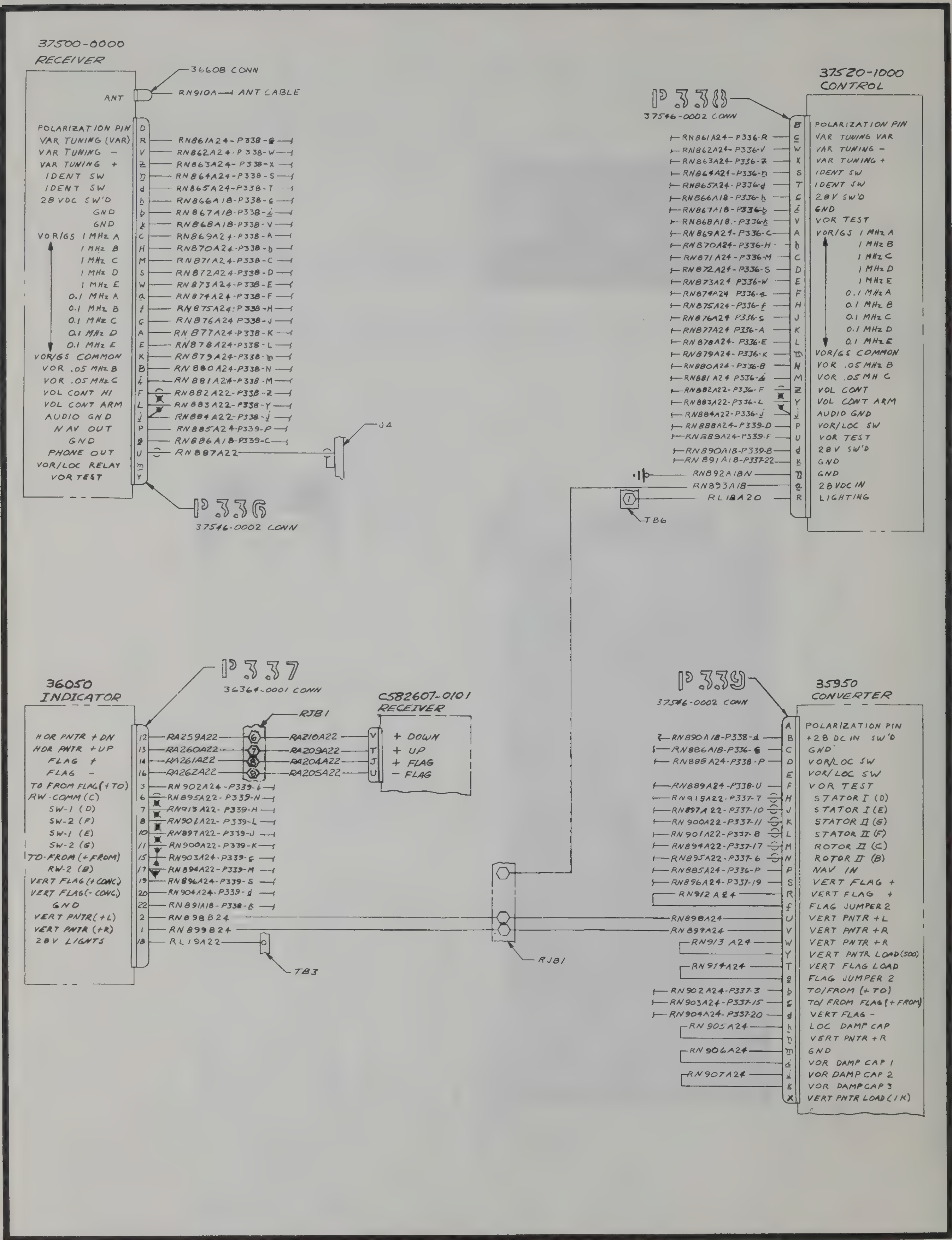


Figure 2-2. Cessna 800 Glideslope/Marker Beacon Receiver (Sheet 1)

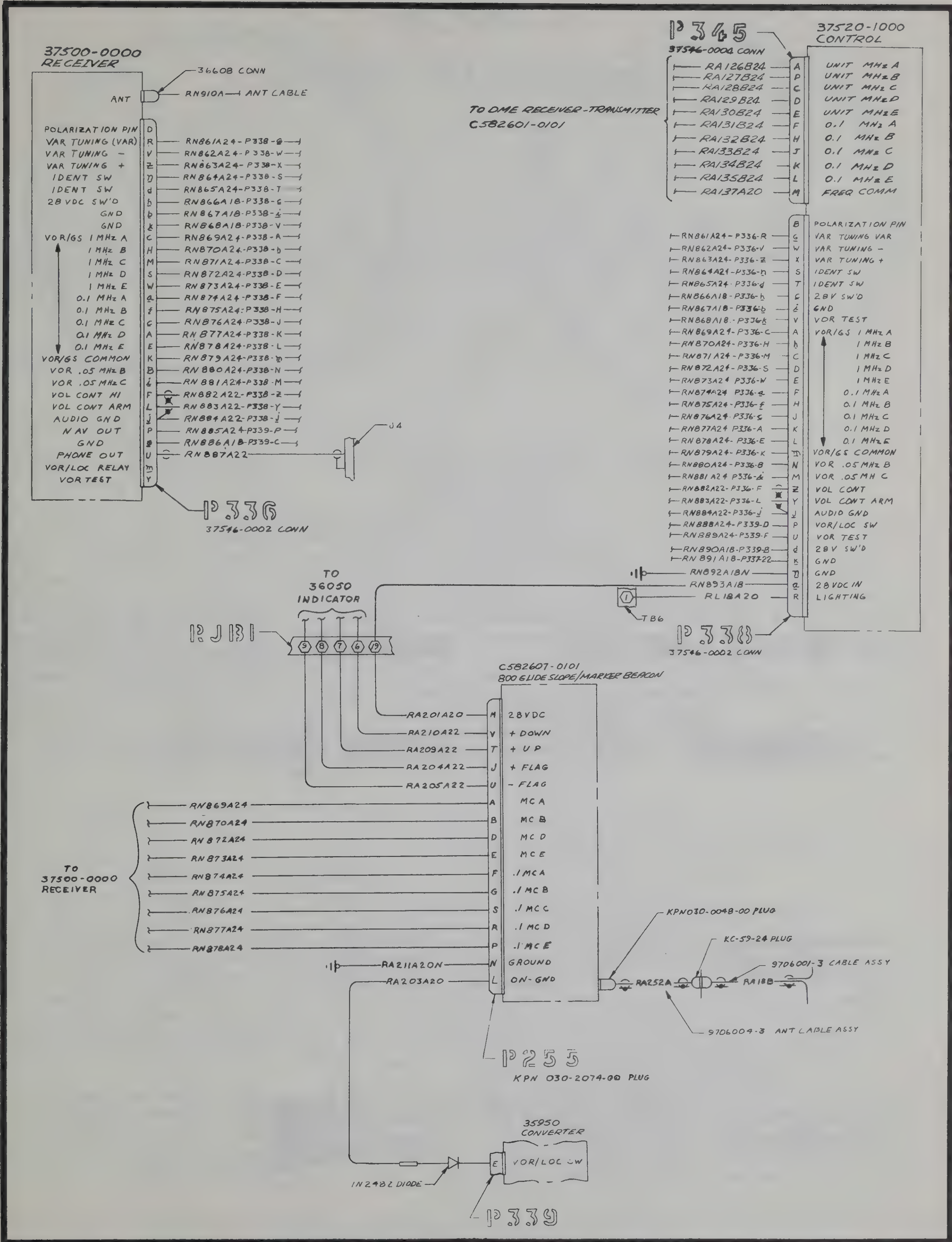
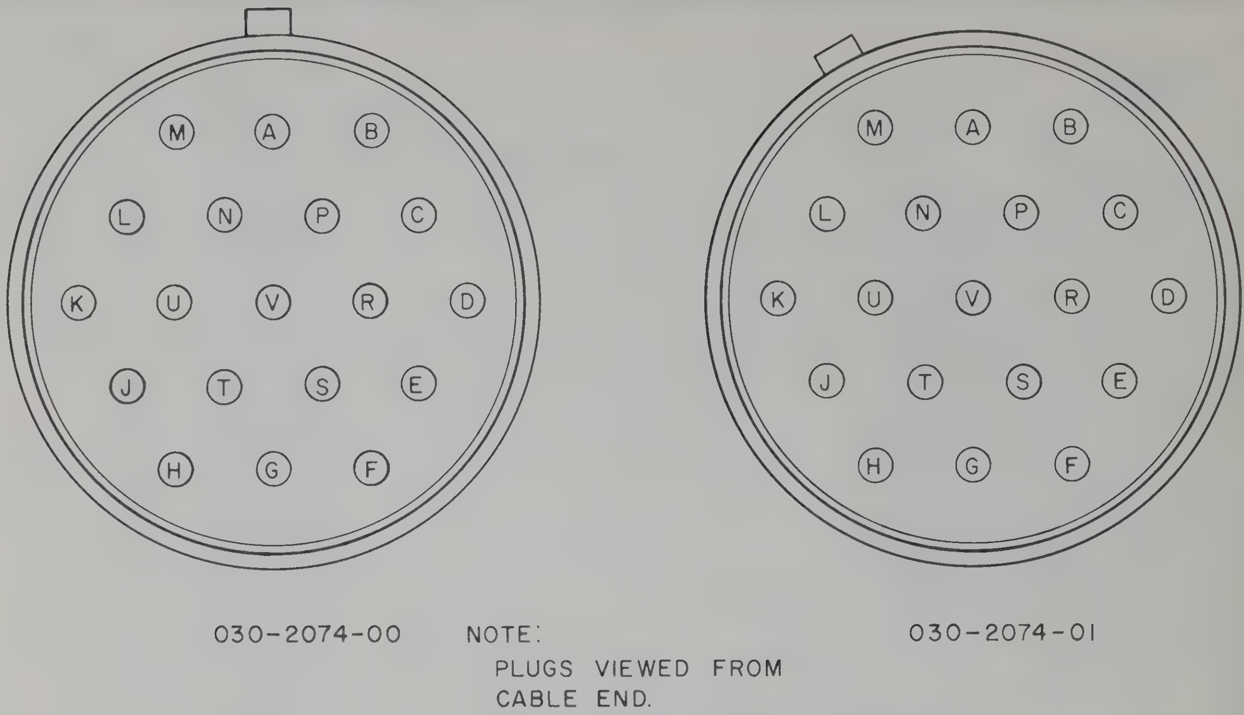
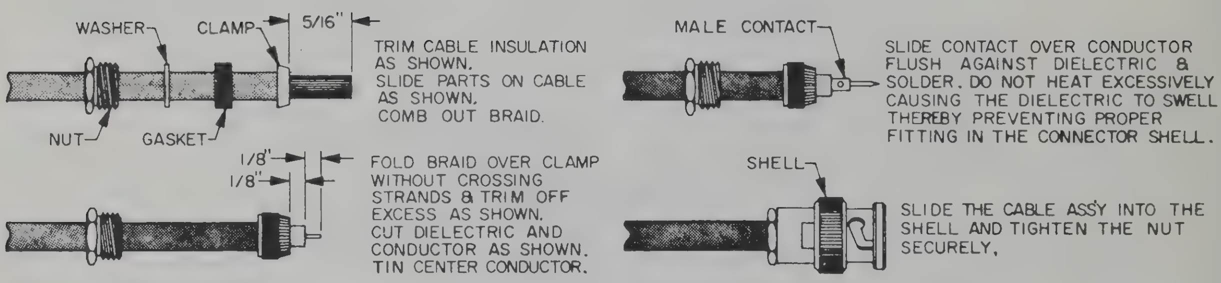


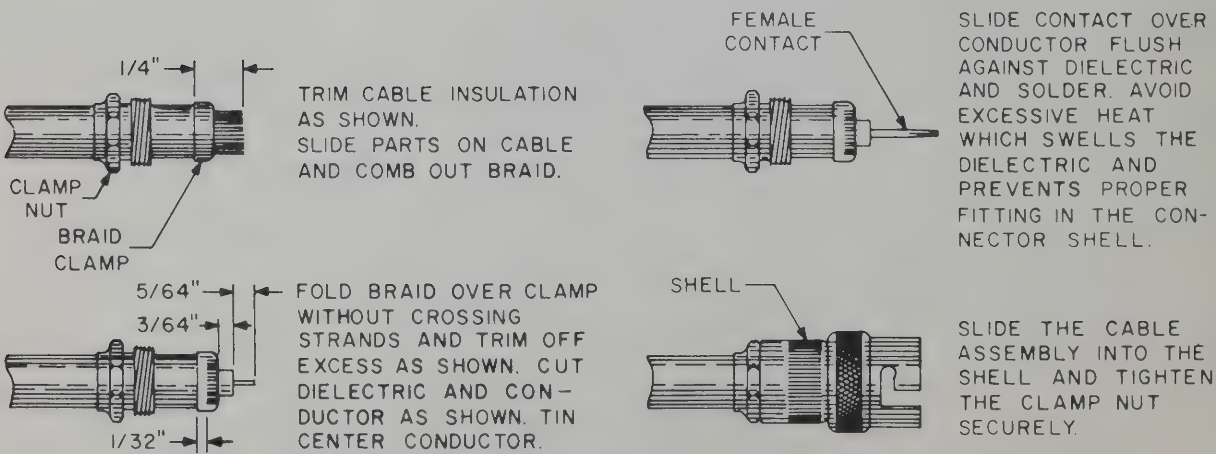
Figure 2-2. Cessna 800 Glideslope/Marker Beacon Receiver (Sheet 2)



CONNECTOR PIN LOCATIONS



BNC ANTENNA CABLE ASSEMBLY



"MB" ANTENNA CABLE ASSEMBLY

Figure 2-3. Antenna Cable Fabrication and Pin Locations

SECTION III

THEORY OF OPERATION

3.1 GENERAL

The Cessna 800 Glideslope/Marker Beacon Receiver theory of operation is presented in this section in two levels of discussion. The first level is a simplified discussion and is referenced to a block diagram. The second level is a detailed discussion and is referenced to the schematic diagrams located in Section 7 of this Manual.

3.2 BLOCK DIAGRAM CIRCUIT THEORY

3.2.1 GLIDESLOPE RECEIVER (Figure 7-1)

The Glideslope Receiver, when used with an appropriate indicator, provides the pilot vertical steering information during ILS approaches.

The glideslope signal from the antenna is coupled into the 332MHz tuned preselector. The preselector attenuates signals outside the 300MHz to 360MHz band at least 60db. The preselector output is connected to mixer CR301. The second input to the mixer is the tripled output from 100MHz oscillator Q306. The 100MHz output frequency is controlled by a crystal connected in the circuit by a 2 out of 5 diode switching scheme. The 22MHz mixer output signal is coupled through a matching network and amplified by three successive i-f amplifier stages. The second and third amplifier stages are agc controlled. The amplifier output is routed through a band-pass filter to second mixer CR304. The injection frequency to the second mixer is supplied by a 25MHz crystal oscillator. The 3MHz mixer output is the input to a four stage 3MHz i-f amplifier. The second stage is agc controlled. The amplifier output is detected. The detector output is used to drive an agc amplifier. A second output from the detector is further amplified by meter amplifier Q316 and Q317. This amplified output is rectified and connected through a flag set control (R412) to control the warning flag. A second output from the rectifier is applied through centering control R411 to drive the deviation needle on an external indicator. The series voltage regualtor provides +16 volts dc from a 27. 5 volt dc input.

3.2.2 MARKER BEACON RECEIVER (Figure 7-4)

The Marker Beacon Receiver, when used with appropriate indicators, provides the pilot visual information of the aircraft passage over beacon stations located on airways or ILS approach courses.

The 75MHz input from the antenna is connected to the preselector which functions as a 75MHz filter. The preselector output is applied to mixer Q113. The injection input to the mixer is the 70. 4MHz output from a crystal controlled oscillator. The mixer output (4. 6MHz) is coupled through a 4. 6MHz filter to a four stage i-f amplifier. The first three stages are agc controlled. The fourth i-f amplifier stage output is the input to a detector/ agc amplifier. The agc amplifier output is applied to agc controlled diodes CR111, CR141, CR151 and CR161. The detector output is routed through audio level control R228 to the audio amplifier, and also to the associated marker lamp amplifier. The three selective amplifiers operate in the same manner except different frequencies (400Hz, 1300Hz, and 3000Hz) activate a different amplifier. The audio amplifier output is transformer coupled to the cockpit speaker or headphone.

The voltage regualtor, consisting of Q101, Q102, and Q103, provides a regulated +9 volt dc voltage from a +14 or +28 volt dc input. The regualtor output provides the operating voltage for the Marker Beacon Receiver.

3.3 DETAILED CIRCUIT THEORY

3.3.1 GLIDESLOPE RECEIVER (Figure 7-2)

3.3.1.1 Preselector. The glideslope signal from the antenna is connected through J694 to the preselector. The preselector is an LC circuit. Capacitors C553, C554, C558, and C560 are used to tune the preselector. The preselector provides rejection of all signals not within the frequency range of 329.3MHz to 335.0MHz. The preselector output is applied to the cathode of diode mixer CR301.

3.3.1.2 100MHz Oscillator. Stage Q306 is a crystal controlled, low noise, oscillator. The crystal connected in the base circuit is selected by the standard 2 out of 5 control scheme employed by the control unit. Diodes CR316 through CR324 block positive voltage from the matrix section. The oscillator output is tuned by use of capacitor C337. Capacitors C339, C338, and C340 provide a rf bypass to ground. Collector to base feedback is employed to sustain oscillation. The oscillator output, in the frequency range of 102.433MHz to 104.333MHz, is coupled through C335 to the base of tripler Q305.

3.3.1.3 Tripler Q305. The tripler input is the output from Q306. Capacitor C342 is used to tune the tripler output. Capacitors C334 and C333 provide a rf bypass to ground. The tripler output, in the frequency range of 307.299MHz to 312.999MHz, is coupled through C301 to the cathode of CR301.

3.3.1.4 Mixer CR301. Diode CR301 provides mixing of the glide slope input signal and the output from Q305. The mixer output is coupled through matching network L301, L302, and C304 to the base of Q301. Coils L301 and L302 provide an impedance match between CR301 and Q301.

3.3.1.5 1st I-F Amplifier Q301. Amplifier Q301 provides the first stage of amplification to the mixer output signal. Resistors R301 through R302 develop the bias applied to Q301. Capacitor C307 bypasses the emitter to ground. The output from Q301 is coupled through C306 to agc controlled diode CR302. Diode CR302 is forward biased by the bias developed by R307 and R308 thus coupling the amplifier output to amplifier Q302. When the output of the 3MHz i-f section increases to a level sufficient to activate the agc voltage circuitry a reverse bias is applied to CR302 to reduce the input to Q302.

3.3.1.6 2nd I-F Amplifier Q302. Second amplifier Q302 and agc controlled diode CR301 function in the same manner as outlined in paragraph 3.3.1.5. The output from Q302 is coupled to amplifier Q303.

3.3.1.7 3rd I-F Amplifier Q303. Third amplifier Q303 provides the final stage of amplification to the glide slope input signal and the tripler output. The output from Q303 is coupled through capacitor C318 to 22MHz filter FL301.

3.3.1.8 FL301. Filter FL301 is a crystal filter which passes the difference frequency of the tripler output and glide slope input. This 22MHz difference signal is applied to diode mixer CR304.

3.3.1.9 Diode Mixer CR304. Diode CR304 provides mixing of the 22MHz output from FL301 and the 25MHz output from oscillator Q304. The 3MHz (difference) mixer output is coupled to 3MHz i-f amplifier Q310.

3.3.1.10 25MHz Oscillator Q304. Oscillator Q304 is a crystal controlled 25MHz oscillator. Feedback is coupled through L305 to sustain oscillation. The oscillator output is coupled through C326 to diode mixer CR304.

3.3.1.11 1st 3MHz I-F Amplifier Q310. Amplifier Q310 provides the first stage of amplification of the 3MHz i-f signal. The amplifier output is coupled through agc controlled diode CR307 to the base of Q311. When the 3MHz i-f amplifier output is sufficient to activate the agc circuit a reverse bias is applied to CR307 thus reducing the signal level coupled to Q311.

3.3.1.12 3MHz I-F Amplifiers Q311, Q312, and Q313. The 3MHz i-f output from Q310 is further amplified by three successive capacitance coupled amplifier stages. Bias for each stage is developed by resistors connected in the base and emitter circuits. The output from amplifier Q313 is coupled through capacitor C366 to the base of detector Q314. Diodes CR308 and CR309 provide temperature compensation to ensure a stable bias applied to the base of Q314.

3.3.1.13 Audio Detector Q314. Audio detector Q314 provides two outputs. The base to emitter circuit provides detection of the audio signal. The base to collector circuit provides the output to the agc amplifier. Variable potentiometer R396 is used to set the level to the meter circuitry. The audio output from Q314 is coupled through capacitor C373 to meter amplifier Q316, paragraph 3.3.1.15.

3.3.1.14 AGC Amplifier Q315. AGC amplifier Q315 provides the agc voltage necessary to provide a constant output from the glide slope receiver. The input is amplified by Q315 and connected to the agc controlled diodes. The agc output level is set by R398. Capacitor C372 provides filtering of the agc voltage.

3.3.1.15 Meter Amplifier Q316. Meter amplifier Q316 further amplifies the output from audio detector Q314. Diode CR310 prevents voltages from the glide slope receiver effecting the associated VOR/LOC units. The meter amplifier is coupled through capacitor C375 to the base of meter driver Q317.

3.3.1.16 Meter Driver Q317. Meter driver Q317 amplifies the input to a level sufficient to drive the flag and meter movements. The high gain, low noise, amplifier is operated in a grounded emitter configuration. The output from Q317 is coupled through filter FL302 to the detector.

3.3.1.17 Detector CR311 through CR314. The detector, consisting of diodes CR311 through CR314, rectify the audio input to produce a dc voltage sufficient to control the flag and meter movements. The flag control voltage amplitude is controlled by potentiometer R412. The diode junction voltage (CR315) prevents flag current from flowing before a certain level is reached to provide crisp flag action. Thermistor RT301 provides temperature compensation for the flag output. Potentiometer R411 controls the amplitude of the rectified meter centering voltage. Capacitors C376, C377, C378, C379, and C381 provide filtering of the rectifier output.

3.3.1.18 Voltage Regulator. The voltage regulator produces a +16 volt dc output from an unregulated 27.5 volt dc input. Resistors R338, R339, R441, and diode CR306 comprise a voltage sensing network. The difference between the output from Q307 and the reference voltage applied to CR306 is amplified by Q309. The output from difference amplifier Q309 is the control bias applied to driver amplifier Q308. The output from Q308 is applied to the base of series regulator Q307. Hence, if the voltage output from Q307 increases, the difference voltage applied to difference amplifier will increase. Thus Q308 will be biased such as to reduce the forward bias applied to Q307 and, therefore, reduce the dc output of the regulator. If the output from Q307 decreases below +16 volts dc the transistors are biased such that the forward bias applied to Q307 is increased thus increasing the dc output from Q307. Diode CR305 provides reverse polarity protection for the voltage regulator. The voltage regulator output provides the operating voltage for the Glide Slope Receiver.

3.3.1.19 Glideslope Tuning Matrix. The tuning matrix employs transistors, diodes, and resistors to change the frequency selected on the control unit to voltages sufficient to control the 20 crystal oscillator. Since all frequencies are selected in the same manner, the selection of only one frequency (108.1) will be discussed. When 108.1MHz is selected on the control unit, mega-Hertz wires A and D are grounded. Kilo-Hertz wires A and B are grounded. Refer to the following chart.

When mega-Hertz wires A and D are grounded, diodes CR324 and CR321 are forward biased. A voltage divider circuit, consisting of R441, R442 and R443, effectively drops the voltage applied to the cathode of CR509 to approximately 7.5 volts. Resistor R501 is connected between the anode of CR509 and the +16 volt supply. Resistor R449 and R451 comprise a voltage divider which drops the voltage applied to the cathode of CR506 to approximately 4 volts dc. Resistor R501 drops the voltage applied to the anode of CR506. Since the voltage applied to the cathode of CR506 is less than the voltage applied to the cathode of CR509, diode CR506 is forward biased. Thus the crystal bank, consisting of Y501, Y505, Y509, Y513, and Y517, have one side of each crystal connected to the oscillator circuit.

When kilo-Hertz wires A and B are grounded, diodes CR316 and CR320 are forward biased. A voltage divider, consisting of R423, R424 and R425, drop the voltage applied to diode CR501 to approximately 8 volts. Diode CR320 effectively grounds one side of R437. Diode CR316 grounds one side of CR438. Thus the voltage applied to diode CR505 will be approximately 4 volts. Resistor R502 drops the voltage applied to the anode of CR501 and CR505. Since the cathode voltage of CR505 is lower than CR501, diode CR505 is forward biased. Crystal Y517 (104.233) is connected into the oscillator circuit due to forward biased diodes CR506 and CR505. All other crystals are quiescent, since only one side of the crystals are electrically connected to the oscillator circuit.

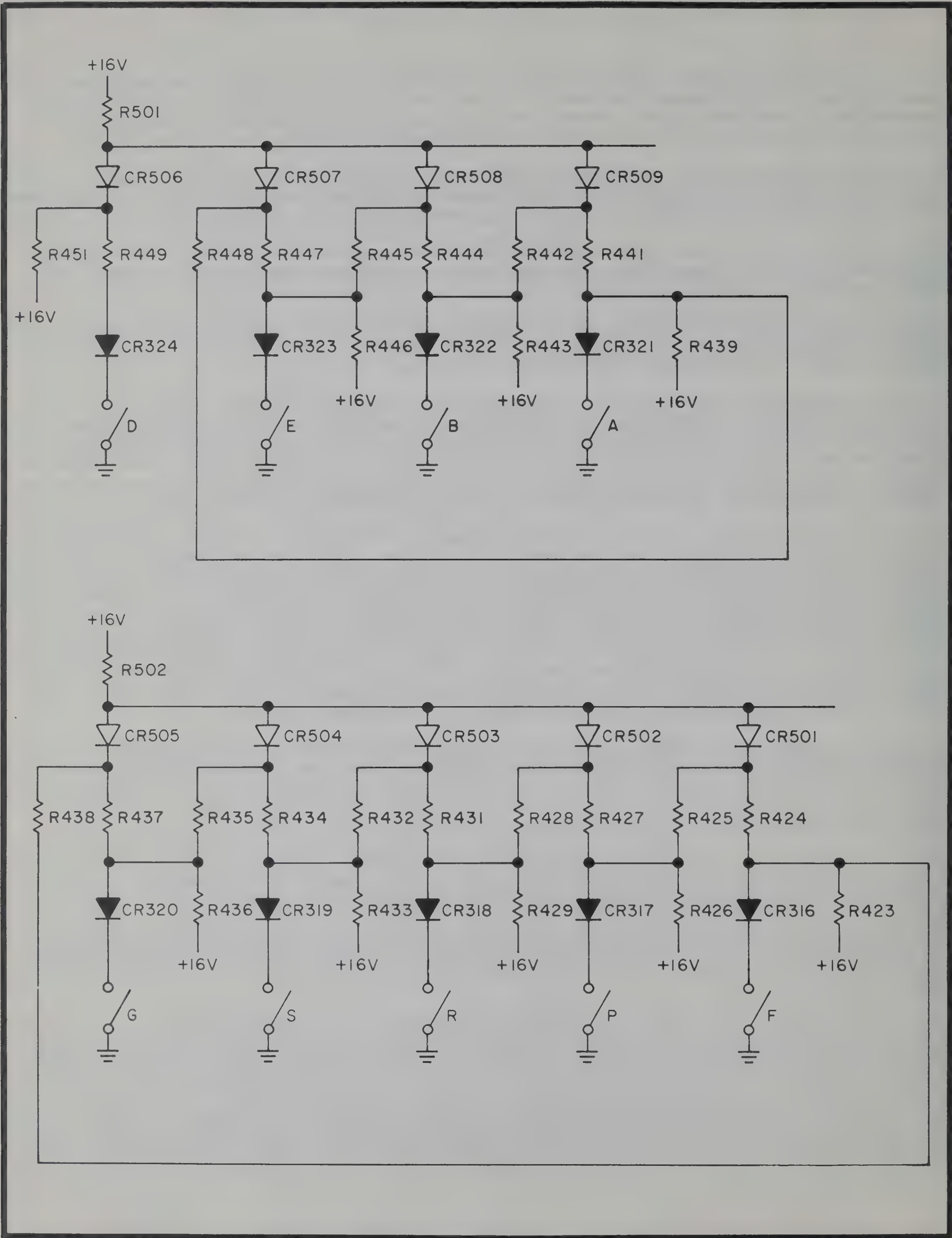


Figure 3-1. Diode Tuning Matrix, Simplified Diagram

CHANNEL FREQUENCY	CRYSTAL	GROUNDED WIRES MHz	GROUNDED WIRES KHz
108.1	Y517	AD	AB
108.3	Y513	AD	BC
108.5	Y509	AD	CD
108.7	Y505	AD	DE
108.9	Y501	AD	AE
109.1	Y518	AE	AB
109.3	Y514	AE	BC
109.5	Y510	AE	CD
109.7	Y506	AE	DE
109.9	Y502	AE	AE
110.1	Y519	BE	AB
110.3	Y515	BE	BC
110.5	Y511	BE	CD
110.7	Y507	BE	DE
110.9	Y503	BE	AE
111.1	Y520	AB	AB
111.3	Y516	AB	BC
111.5	Y512	AB	CD
111.7	Y508	AB	DE
111.9	Y504	AB	AE

NOTE

The even kilo-Hertz (2, 4, 6, 8, 0) frequencies are reserved for VOR operation.

3.3.2 MARKER BEACON RECEIVER (Figure 7-5)

3.3.2.1 Preselector. The 75MHz marker signal from the antenna is connected through J693 to the preselector. The preselector is an LC network. Inductors L131, L132, and L133 are used to tune the preselector. The preselector provides rejection of all frequencies except the 75MHz marker signal. The preselector output is coupled through agc controlled diode CR111 to the base of Q113. The amplitude of the 75MHz marker signal applied to Q113 is determined by the conduction state of CR111. The agc voltage applied to CR111 tends to keep the 75MHz input to Q113 at a level to provide a constant output.

3.3.2.2 Oscillator Q111. Stage Q111 is a crystal controlled oscillator operating at a frequency of 70.4MHz. Positive feedback from collector to emitter is used to sustain oscillation. The oscillator output is coupled through C113 to mixer Q113.

3.3.2.3 Sensitivity Control Q112. The bias applied to sensitivity control Q112 is controlled by a sensitivity switch connected to the base circuit. The sensitivity switch connects a ground to the base of Q112 in the "Hi" position and removes the ground in the "Lo" position. Sensitivity control Q112 is operated as a common emitter switch. Resistor R121 is used to set the bias applied to diode CR112. The conduction state of CR112 determines the output from mixer Q113. Diode CR112 thus determines the sensitivity of the Marker Beacon Receiver by "loading" the mixer output. Thermistor RT111 provides temperature compensation for Q112.

3.3.2.4 Mixer Q113. The mixer inputs are the 75MHz marker signal and 70.4MHz output from oscillator Q111. The base to emitter junction provides the mixing. The collector output is applied to a LC filter, FL101. The filter rejects all signals except the mixer difference frequency of 4.6MHz. The mixer output is coupled through C142 and agc controlled diode CR141 to the base of first i-f amplifier Q141.

3.3.2.5 I-F Amplifiers. The i-f amplifier section, consisting of Q141, Q151, Q161, and Q171, provide four consecutive, capacitively coupled, stages of i-f amplification. The first three stages are agc controlled. The agc action tends to produce a constant output level to the marker lamps. The final amplifier output is applied to detector/agc amplifier Q181. Diodes CR181, CR182, and CR183 provide temperature compensation for the Detector/AGC Amplifier.

3.3.2.6 Detector/AGC Amplifier Q181. The base to emitter junction provides the audio detection and the base to collector junction provides the agc voltage amplification. The agc voltage is applied to the agc controlled diodes. The audio, which consists of the 3KHz, 1.3KHz, or 400Hz marker signal, is applied to the selective amplifier circuits and to the audio amplifier. Thermistor RT101 provides temperature compensation for the audio output circuit. The audio level applied to the audio amplifier is adjusted by potentiometer R228.

3.3.2.7 Audio Amplifier Q221 and Q222. The marker signal is amplified by two successive direct coupled stages, Q221 and Q222. Capacitors C221 and C223 provide dc blocking from the base of Q222 and Q224. The output from Q222 is applied to driver Amplifier Q224.

3.3.2.8 Driver Amplifier Q223 and Q224. The output from Q222 is further amplified by driver amplifier Q224. Driver amplifier Q224 is employed in a common emitter configuration. Diodes CR221 and CR222 provide dc biasing for Q223. Capacitor C222 provides a by-pass for high frequency stability. The output from driver amplifier Q224 is coupled through transformer T261 to the cockpit speaker or headphone circuitry.

3.3.2.9 3KHz Selective Amplifier. The marker signal from Q181 is coupled through C191 to amplifier Q191. The output from Q191 is direct coupled to amplifier Q192. A notch filter in the negative feedback loop around Q191 and Q192 consisting of C192, C193, R193, and R194 is designed to reject only the 3KHz marker signal and pass the 1.3KHz and 400Hz marker signals thus giving maximum gain at 3KHz. The output from Q192 is coupled through C231 to lamp driver Q231.

3.3.2.10 Lamp Driver Q231 and Q232. The input to lamp driver Q231 is the output from Q192. Diode CR231 rectifies the ac output from Q192. The rectified signal is applied to Q231. The amplified output from Q231 is further amplified by Q232 to a level sufficient to activate the airway (white) marker lamp.

3.3.2.11 1.3KHz Selective Amplifier. The 1.3KHz selective amplifier, consisting of Q201 and Q202, functions in the same manner as the 3KHz selective amplifier, paragraph 3.3.2.9, except the notch filter is designed to reject the 1.3KHz marker signal and pass the 3KHz and 400Hz signal.

3.3.2.12 Lamp Driver Q241 and Q242. The lamp driver functions in the same manner as described in paragraph 3.3.2.10 except the middle marker (amber) lamp is illuminated by the 1.3KHz signal.

3.3.2.13 400Hz Selective Amplifier. The 400Hz selective amplifier, consisting of Q212 and Q213, functions in the same manner described in paragraph 3.3.2.9 except the notch filter is designed to reject only the 400Hz marker signal.

3.3.2.14 Lamp Driver Q251 and Q252. The lamp driver functions in the same manner described in paragraph 3.3.2.10 except the outer marker (blue) lamp is illuminated by the 400Hz signal.

3.3.2.15 Voltage Regulator. The voltage regulator produces a +9 volt dc output from an unregulated 27.5 volt dc input. Resistors R104, R105, R106, and diode CR102 comprise a voltage sensing network. The difference between the output from Q101 and the reference voltage applied to CR102 is amplified by Q103. The output from difference amplifier Q103 is the control bias applied to driver amplifier Q102. The output from Q102 is applied to the base of series regulator Q101. If the voltage output from Q101 increases the difference voltage applied to the difference amplifier will increase. Thus, Q102 will be biased such as to reduce the forward bias applied to Q101, and therefore, reduce the dc output of the regulator. If the output from Q101 decreases below +9 volts dc the transistors are biased such that the forward bias applied to Q101 is increased thus increasing the dc output from Q101. Diode CR101 provides reverse polarity protection from the voltage regulator. The voltage regulator output provides the operating voltage for the Marker Beacon Receiver.

SECTION IV

OPERATION

4.1 GENERAL

The Cessna 800 Glideslope/Marker Beacon Receiver can be controlled by a standard navigation receiver tuning unit such as the C-41A. The IN 41A also presents radio navigation information from the Cessna 800 Glideslope/Marker Beacon Receiver to the pilot by use of cross pointer needles.

To (energize) apply power to the Cessna 800 Glideslope/Marker Beacon Receiver and C-41A, turn the VOL control, outer (small) control located in the center of the unit, clockwise. Use the inner (large) control (OBS) to select omni bearing headings. Use the two large controls to select the operating frequency. The frequency selected is displayed in the "window" located above the controls.

Refer to table 4-1 for a LOC/Glideslope frequency chart.

Table 4-1 LOC/Glideslope Frequency Chart.

CHANNEL NUMBER	G. S. FREQ (MHz)	LOC FREQ (MHz)	LOC FREQ (MHz)	G. S. FREQ (MHz)
1	329.3	108.9	108.1	334.7
2	329.6	110.5	108.3	334.1
3	329.9	108.5	108.5	329.9
4	330.2	110.7	108.7	330.5
5	330.5	108.7	108.9	329.3
6	330.8	110.9	109.1	331.4
7	331.1	111.9	109.3	332.0
8	331.4	109.1	109.5	332.6
9	331.7	111.1	109.7	333.2
10	332.0	109.3	109.9	333.8
11	332.3	111.3	110.1	334.4
12	332.6	109.5	110.3	335.0
13	332.9	111.5	110.5	329.6
14	333.2	109.7	110.7	330.2
15	333.5	111.7	110.9	330.8
16	333.8	109.9	111.1	331.7
17	334.1	108.3	111.3	332.3
18	334.4	110.1	111.5	332.9
19	334.7	108.1	111.7	333.5
20	335.0	110.3	111.9	331.1

4.2 GLIDESLOPE OPERATION

The glideslope signal is transmitted from the ground station at a designated degree of upward slope. This signal is used to provide the pilot vertical steering information during an ILS approach. The rf carrier is modulated with a 90Hz and 150Hz audio signal. Due to the radiation pattern of the glideslope antenna, two intersecting lobes are effectively produced. The lobe above the normal glide path is predominantly modulated with 150Hz. The lobe below the normal glide path is predominantly modulated with 90Hz. The two audio signals are equal along a line bisecting the center of the glide path. This line of equal modulation defines the glide path. The Glideslope Receiver compares the two audio (90Hz and 150Hz) signals. When the aircraft in on the glide path, the signals are equal and the outputs from the glideslope is such that the glideslope deviation needle on the associated indicator is "centered." If the aircraft is below the glide path, the received signal will be

modulated with a predominantly 90Hz signal. Therefore, the output from the glideslope is such that the glideslope deviation needle is deflected upward indicating that the pilot must climb (increase altitude) to intercept the desired glide path. If the aircraft is above the glide path, the glideslope signal will be modulated with a predominantly 150 Hz signal. Thus, the output from the glideslope is such that the glideslope deviation needle is deflected downward indicating that the pilot must descent (decrease altitude) to intercept the desired glide path. As the aircraft comes closer to the end of the runway, the glide path becomes more narrow and smaller corrections are necessary. The needle deflection will become more sensitive.

4.3 MARKER BEACON RECEIVER OPERATION

The three light marker system is employed to provide a visual and audible indication of the aircraft passage over a ground station. The white lamp (FM) is illuminated by a 75MHz rf signal modulated by a 300Hz audio signal. The fan marker (FM) is usually located along airways. The blue lamp (OM) is illuminated by a 75MHz rf signal modulated by a 1300Hz audio signal. The outer marker (OM) is usually located from 4 to 10 miles from the approach end of a ILS runway. The amber lamp (MM) is illuminated by a 75MHz rf signal modulated by a 400Hz audio signal. The middle marker is usually located approximately 3200 feet from the end of the runway. The Marker Beacon Receiver determines which of the three ground stations the aircraft is over and the appropriate output controls the associated lamp. The Marker Beacon Receiver also detects the audio signal and provides an output to the aircraft speaker and/or headphone circuitry.

SECTION V

MAINTENANCE

5.1 GENERAL

Maintenance information contained in this section includes inspection procedures, cleaning, semiconductor and tube replacement, troubleshooting, and alignment procedures.

5.2 VISUAL INSPECTION

The following visual inspection procedures should be performed during the course of maintenance operations:

a. Inspect all wiring for frayed, loose, or burned wires.

b. Check cable connections, making sure the plugs are free from corrosion and are properly secured.

c. Check components for evidence of overheating, breakage, vibration, corrosion, or loose connections.

d. Check all capacitors and transformers for leaks, bulges, or loose connections.

e. Inspect relay and switch contacts for pits or arcing.

5.3 CLEANING

a. Using a clean lint-free cloth lightly moistened with an approved cleaning solvent, remove the foreign matter from the equipment case and unit front panels. Wipe dry using a clean, dry, lint-free cloth.

b. Using a hand controlled dry air jet (not more than 15 psi), blow the dust from inaccessible areas. Care should be taken to prevent damage by the air blast.

c. Clean electrical contacts with a burnishing tool or cloth lightly moistened with an approved contact cleaner.

d. Clean the receptacles and plugs with a hand controlled dry air jet (not more than 25 psi) and a clean lint-free cloth lightly moistened with an approved cleaning solvent. Wipe dry with a clean, dry, lint-free cloth.

5.4 SEMICONDUCTOR REPLACEMENT

It is recommended that semiconductors not be tested or replaced until unsatisfactory performance is observed.

5.5 SEMICONDUCTOR MAINTENANCE

5.5.1 GENERAL

Due to the wide utilization of semiconductors in this electronic equipment, somewhat different techniques are necessary in maintenance procedures. In solid state circuits the impedances and resistances encountered are of much lower values than those encountered in vacuum-tube circuits. Therefore, a few ohms discrepancy can

greatly affect the performance of the equipment. Also, coupling and filter capacitors are of larger values and usually are of tantalum type. Hence, when measuring resistances, an instrument very accurate in the low resistance ranges must be used, and when measuring values of capacitors, an instrument accurate in the high ranges must be employed. Capacitor polarity must be observed when measuring resistance. Usually more accurate measurements can be obtained if the semiconductors are removed or disconnected from the circuit.

5.5.2 SEMICONDUCTOR TEST EQUIPMENT

Damage to semiconductors by test equipment is usually the result of accidentally applying too much current or voltage to the elements. Common causes of damage from test equipment are discussed in the following paragraphs.

5.5.2.1 Transformerless Power Supplies. Test equipment with transformerless power supplies is one source of high current. However, this type of test equipment can be used by employing an isolation transformer in the ac power line.

5.5.2.2 Line Filter. It is still possible to damage semiconductors from line current, even though the test equipment has a power transformer in the power supply, if the test equipment is provided with a line filter. This filter may act like a voltage divider and apply half voltage to the semiconductor. To eliminate this condition, connect a ground wire from the chassis of the test equipment to the chassis of the equipment under test before making any other connections.

5.5.2.3 Low-Sensitivity Multimeters. Another cause of semiconductor damage is a multimeter that requires excessive current to provide adequate indications. Multimeters with sensitivities of less than 20,000-ohms-per-volt should not be used on semiconductors. A multimeter with low sensitivity will draw too much current through many types of small semiconductors, causing damage. When in doubt as to the amount of current supplied by a multimeter, check the multimeter circuits on all scales with an external, low-resistance multimeter connected in series with the multimeter leads. If more than one milliampere is drawn by the multimeter on any range, this range cannot be safely used on small semiconductors.

5.5.2.4 Power Supply. When using a battery-type power supply, always use fresh batteries of the proper value. Make certain that the polarity of the power supply is correct for the equipment under test. Do not use power supplies having poor voltage regulation.

5.5.3 SEMICONDUCTOR VOLTAGE AND RESISTANCE MEASUREMENTS

When measuring voltages or resistances in circuits containing semiconductor devices, remember that these components are polarity and voltage conscious. Since the values of capacitors used in semiconductor circuits are usually large (especially in audio, servo, or power circuits) time is required to charge these capacitors when an ohmmeter is connected to a circuit in which they appear. Thus, any reading obtained is subject to error if sufficient time is not allowed for the capacitor to fully charge. When in doubt, it may be best in some cases to isolate the components in question and measure them individually.

5.5.4 TESTING OF TRANSISTORS

A transistor checker should be used to properly evaluate transistors. If a transistor tester is not available, a good multimeter may be used. Make sure that the multimeter meets the requirements outlined in preceding paragraph 5.5.2.3.

5.5.4.1 PNP Transistor. To check a PNP transistor, connect the positive lead of the multimeter to the base of the transistor and the negative lead to the emitter. Generally, a resistance reading of 50,000 ohms or more should be obtained. Reconnect the multimeter with the negative lead to the base. With the positive lead connected to the emitter, a resistance value of 500 ohms or less should be obtained. When the positive lead is connected to the collector, a value of 500 ohms or less should likewise be obtained.

5.5.4.2 NPN Transistor. Similar test made on an NPN transistor should produce the following results: With the negative lead of the multimeter connected to the base of the transistor, the value of resistance between the

base and the collector should be high. With the positive lead of the multimeter connected to the base, the value of resistance between the base and collector should be low. If these results are not obtained, the transistor is probably defective and should be replaced.

CAUTION

If a transistor is found to be defective, make certain that the circuit is in good operating order before installing a replacement transistor. If a short circuit exists in the circuit, putting in another transistor will most likely result in burning out the new component. Do not depend upon fuses to protect transistors.

5.5.4.3 Always check the value of the bias resistors in series with the various transistor elements. A transistor is very sensitive to improper bias voltage; therefore, a short or open circuit in the bias resistance may damage the transistor. For this reason, do not trouble shoot by shorting the various points in the circuit to ground and listening for clicks.

5.5.5 REPLACING SEMICONDUCTORS

Never remove or replace a plug-in semiconductor with the supply voltage turned on. Transients thus produced may damage the semiconductors or others remaining in the circuit. If a semiconductor is to be evaluated in an external test circuit, be sure that no more voltage is applied to the semiconductor than normally is used in the circuit from which it came.

5.5.5.1 Use only a low-heat soldering iron when installing or removing soldered-in parts. Use care in the handling of printed circuit boards. When removing a part from a printed circuit board, first unbend the crimped leads. Use only the necessary amount of heat to unsolder the part. Clear excess solder from mounting eyelets, making sure that mounting holes are clear before installing new part. When removing a transformer or other part having a multiple number of leads, straighten (unbend) all leads first and then heat leads one at a time, working around the part, until the part can be gently "rocked out."

5.5.5.2 When installing or removing a soldered-in semiconductor grasp the lead to which heat is applied between the solder joint and the semiconductor with long-nosed pliers. This will dissipate some of the heat that would otherwise conduct into the semiconductor from the soldering iron. Make certain that all wires soldered to semiconductor terminals have first been properly tinned so that the necessary connection can be made quickly. Excessive heat will permanently damage a semiconductor.

5.5.5.3 When soldering is required to remove a component from a semiconductor socket, remove the semiconductor to prevent damage to the semiconductor.

5.5.5.4 In some cases, power transistors are mounted on heat-sinks that are designed to dissipate heat away from them. In some power circuits, the transistor must also be insulated from ground. Often this insulating is accomplished by means of insulating washers made of fiber and mica. When replacing transistors mounted in this manner, be sure that the insulating washers are replaced in proper order. Before installing the mica washers, treat them with a film of silicone grease. This treatment helps in the transfer of heat. After the transistor is mounted, and before making any connections, check from the case of the transistor to ground with a multimeter to see that the insulation is effective.

5.6 TROUBLESHOOTING

Tables 5-1 and 5-2 are voltage charts to aid the technician in sectionalizing and localizing sources of trouble in the Cessna 800 Glideslope/Marker Beacon Receiver. Circuit tracing and isolation of a defective component is most easily accomplished with the schematic diagrams included in Section 7 of this instruction manual.

Table 5-1 Mega-Hertz Channeling Diode Voltage Measurements

FREQUENCY	CR321 "A" Wire Voltage	Current	CR322 "B" Wire Voltage	Current	CR323 "E" Wire Voltage	Current	CR324 "D" Wire Voltage	Current
108.0MHz	+0.86V	63ma	+11.25V	0.0ma	+11.05V	0.0ma	+ 0.70V	10ma
109.0MHz	+0.84V	53ma	+ 8.75V	0.0ma	+ 0.82V	52ma	+16.0V	0.0ma
110.0MHz	+8.48V	0.0ma	+ 0.81V	55ma	+ 0.81V	52ma	+16.0V	0.0ma
111.0MHz	+0.84V	52ma	+ 0.81V	55ma	+ 8.42V	0.0ma	+16.0V	0.0ma

Table 5-2 Tenth Mega-Hertz Channeling Diode Voltage Measurements

FREQUENCY	CR316 "A" Wire Voltage	Current	CR317 "E" Wire Voltage	Current	CR318 "D" Wire Voltage	Current	CR319 "C" Wire Voltage	Current
0.1MHz	+ 0.82V	38ma	+12.8V	0.0ma	+14.8V	0.0ma	+12.9V	0.0ma
0.3MHz	+12.9V	0.0ma	+14.8V	0.0ma	+12.8V	0.0ma	+ 0.82V	38ma
0.5MHz	+14.8V	0.0ma	+12.8V	0.0ma	+ 0.80V	37ma	+ 0.82V	38ma
0.7MHz	+12.9V	0.0ma	+ 0.78V	37ma	+ 0.80V	37ma	+12.9V	0.0ma
0.9MHz	+ 0.83V	38ma	+ 0.78V	37ma	+12.8V	0.0ma	+14.8V	0.0ma

FREQUENCY	CR320 "B" Wire Voltage	Current
0.1MHz	+ 0.80V	37ma
0.3MHz	+ 0.80V	37ma
0.5MHz	+12.8V	0.0ma
0.7MHz	+14.8V	0.0ma
0.9MHz	+12.8V	0.0ma

Voltage measurements made with Digitec 201 Digital voltmeter.
Voltages measured on "radio side" of diode.
Current measured on "connector side" of diode.

5.7 TEST EQUIPMENT

The following test equipment, or equivalent, is required to properly align the Cessna 800 Glide Slope/Marker Beacon Receiver:

a. RF Signal Generator: Hewlett Packard Model 608D.

b. Audio Signal Generator: Hewlett Packard Model 200CD.

c. Oscilloscope: Tektronix Model 515A.

d. VTVM: RCA Senior Voltohmyst.

e. Glideslope Generator: Boonton Model 232-A.

f. Power Supply: Electro NFB; filtered, low impedance, voltage variable from 10 to 28 volts at 1/2 ampere.

g. Attenuator: 6db, 50 ohm unbalanced to 50 ohm unbalanced.

h. Glideslope Indicator Test Panel: Capable of performing proper channel switching; circuit for metering flag current from 0-500μa. Circuit for metering glide slope deflection from 150-0-150μa. ILS energize switch and meter for monitoring total receiver current drain is desirable, 0. 5 amp full scale. A typical test panel schematic diagram is shown in figure 5-4.

i. Three Lamp Marker Indicator: Such as IN-41A or Marker Test Panel with suitable lamp loads of 60ma and 120ma, and a means for measuring lamp voltages, marker sensitivity switch, and a means for monitoring total marker current drain is desirable, 0. 5 amp full scale. A typical test panel schematic is shown in figure 5-4.

j. 600 Ohm Load:

5. 8 ADJUSTMENT PROCEDURES

5. 8. 1 PRELIMINARY ADJUSTMENTS

a. Remove the dust cover and connect the unit to the test set.

b. Connect the VTVM between chassis ground and the +16 volt (A+ bus), figure 5-1.

c. Select R341 from 1. 8K ohms or 2. 2K ohms 5% resistors to provide a 16 ±0. 5 volts indication on the VTVM.

5. 8. 2 GLIDESLOPE RECEIVER ADJUSTMENTS

a. If necessary, perform the steps of procedure outlined in paragraph 5. 8. 1.

b. Set the 232-A output to 332. 0MHz. Set the C-41A to operate on 109. 3MHz.

c. Connect the 232-A output through a 6db attenuator to the Glideslope Receiver antenna jack.

d. Connect the VTVM between chassis ground and the AGC bus (green test point) figure 5-1.

e. Set the 232-A TONE RATIO control to the 0 position, (standard centering current). Set the 232-A output level to produce a 4. 5 volt indication on the VTVM.

f. Note that the VTVM indication increases with an increase in the 232-A output level and VTVM indication decreases with a decrease in the 232-A output level. Maintain minimum 232-A output level to produce the preceding conditions.

g. Adjust C337 (oscillator tuning), figure 5-1, to obtain a maximum indication on the VTVM. Adjust C342, (tripler tuning), to obtain a maximum indication on the VTVM.

h. Sequentially adjust C553, C554, C558, and C560 (preselector), figure 5-1, to obtain a maximum indication on the VTVM.

i. Set the 232-A output level to 700 microvolts. Observe that at least a 7. 5 volt indication is displayed by the VTVM.

5. 8. 3 GLIDESLOPE METER CIRCUIT ADJUSTMENTS

a. If necessary, perform the steps of procedure outlined in paragraph 5. 8. 2.

b. Connect the oscilloscope across R396 (Sens Set), figure 5-1.

c. Adjust R398 (AGC Set), figure 5-1, to obtain a 1-volt peak-to-peak indication on the oscilloscope.

d. Set the 232-A TONE RATIO control to the 2. 0 position (standard deflection).

e. Set the DEVIATION METER to high current range (150 microamperes full scale). Adjust R396 to obtain a 78μa indication on the DEVIATION METER.

f. Set the 232-A TONE RATIO control to the 0 position (standard centering current). Set DEVIATION METER to low current range (50μa).

g. Adjust R411 (centering), figure 5-1, to obtain a 0 indication on the DEVIATION METER.

h. Adjust R412 (flag set) to obtain a 325μa indication on the FLAG CURRENT METER.

i. Perform steps c. through h. until the results are acceptable.

j. Set the 232-A FREQUENCY control to the 329. 3 position. Set the C-41A to 108. 9MHz.

k. Set the 232-A TONE RATIO to zero (0). Observe that DEVIATION METER indication is within 5% of standard deflection of zero (0).

l. Set the 232-A TONE RATIO to zero (0). Observe that the FLAG CURRENT METER indication is 325μa $\pm$20μa.

m. Set the 232-A TONE RATIO to the 2. 0 position. Observe that the DEVIATION METER indication is 78μa $\pm$5%. Set DEVIATION METER to high current range.

n. Set the 232-A FREQUENCY control to 335. 0MHz. Set the C-41A to 110. 3MHz. Perform steps k., l., and m.

o. Decrease the 232-A OUTPUT LEVEL control until the DEVIATION METER indicates 46μa. Observe that the 232-A OUTPUT LEVEL control indication is below 20μv. Set the DEVIATION METER to low current range.

p. If the indication obtained in step k. through o. are not acceptable, readjust C553, C554, C558, and C560 (C337 and C342 if necessary) until the results are satisfactory.

q. Set the 232-A OUTPUT LEVEL control until the DEVIATION METER indicates 46μa. Observe that the 232-A OUTPUT LEVEL control indication is below 20μv.

r. Repeat steps k., l., m., and p. with the 232-A FREQUENCY control set to each glide slope channel frequency. (See table 4-1.)

s. If the Marker Beacon Receiver adjustment procedures are not to be performed, disconnect the test set and replace the dust cover.

5.8.4 MARKER BEACON RECEIVER ADJUSTMENT PROCEDURES

a. Remove the dust cover and connect the unit to the test set.

b. Connect the 608D output through a 6db attenuator to the Marker Beacon Receiver antenna jack.

c. Connect the 200CD output to the 608D EXT. MOD jack. Connect the VTVM between chassis ground and AGC bus (green test point), figure 5-2.

d. Set the 608D to produce a 75MHz output signal. Set the 200CD to produce a 1300Hz signal modulated 95%.

e. Set the Marker Beacon Receiver to LOW sensitivity If necessary, adjust the 608D output level to obtain an indication on the VTVM.

f. Sequentially adjust L131, L132, and L133 (preselector), figure 5-2, to obtain a minimum indication on the VTVM.

g. Set the 608D to produce a 75MHz, 2 millivolt output. Set the LAMP FUNCTION switch to the MM position.

h. Adjust R121 (sensitivity set) to obtain a 3. 2 volt (threshold) indication on the LAMP VOLTAGE METER. Observe that the amber lamp is illuminated.

i. Connect the VTVM across the meter test pin to ground. Set the Marker Beacon Receiver to HIGH sensitivity.

j. Adjust R228 (audio level) to obtain a 7. 74 volt (100 milliwatt) indication on the VTVM.

NOTE

If the Marker Beacon Receiver is used with an audio amplifier, adjust R228 to obtain a 1 volt indication on the VTVM.

k. Set the Marker Beacon Receiver to LOW sensitivity. Set the 608D output level to produce a 3. 2 volt indication on the LAMP VOLTAGE meter. Observe that the 608D output is 2 millivolts. If not,set R121 for a threshold level of 2mv.

l. Set the 608D output to 2 millivolts. Set the 200CD output to 3000Hz modulated 95%. Set the LAMP FUNCTION switch to the FM position.

m. Set the 608D attenuation control to obtain a 3. 2 volt indication on the LAMP VOLTAGE meter. Observe that the white lamp is dimly illuminated. Note the 608D attenuation control setting.

n. Set the 608D output to 2 millivolts. Set the 200CD output to 400Hz modulated 95%. Set LAMP FUNCTION switch to the MM position.

o. Set the 608D attenuation control to obtain a 3. 2 volt indication on the LAMP VOLTAGE meter. Observe that the blue lamp is illuminated. Observe that the 608D attenuation control setting in steps k. , m. , and o. do not vary more than 9db.

p. Set the Marker Beacon Receiver to HIGH sensitivity.

q. Set the 200CD output to 400Hz. Set the LAMP FUNCTION switch to the MM position.

r. Set the 608D output to obtain a 3. 2 volt indication on the LAMP VOLTAGE meter. Observe that the 608D attenuation control setting is less than 200 microvolts and the blue lamp is illuminated.

s. Set the 200CD output to 1300Hz. Set the LAMP FUNCTION switch to the OM position.

t. Set the 608D output to obtain a 3. 2 volt indication on the LAMP VOLTAGE meter. Observe that the 608D attenuation control setting is less than 200 microvolts and the amber lamp is illuminated.

u. Set the 200CD output to 3000Hz. Set the LAMP FUNCTION switch to the FM position.

v. Set the 608D output to obtain a 3. 2 volt indication on the LAMP VOLTAGE meter. Observe that the 608D attenuation control setting is less than 200 microvolts and the white lamp is illuminated.

w. Disconnect the unit from the test set and replace the dust cover.

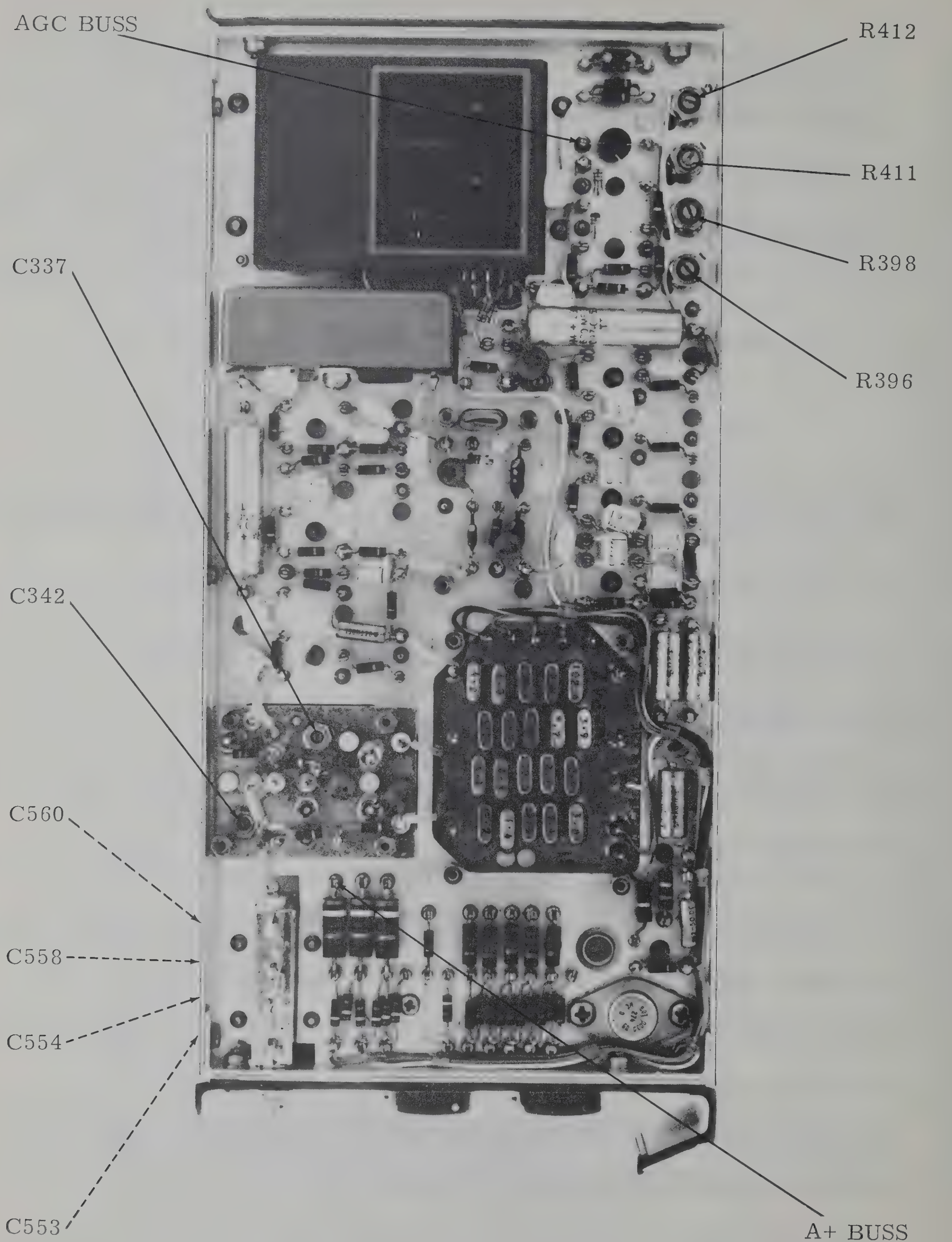


Figure 5-1. Glideslope Receiver Test Point and Adjustment Locations

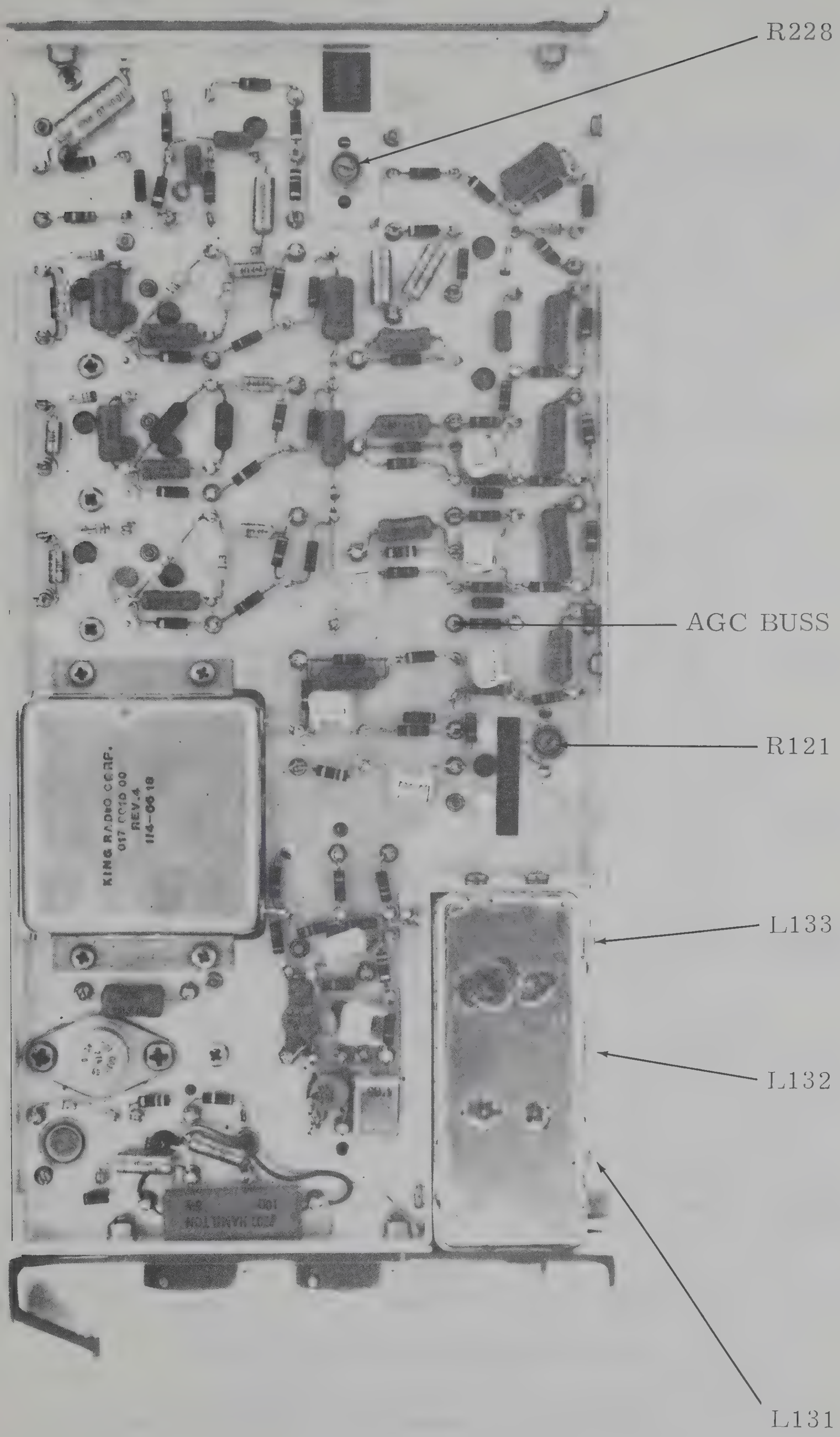


Figure 5-2. Marker Beacon Receiver Test Point and Adjustment Locations

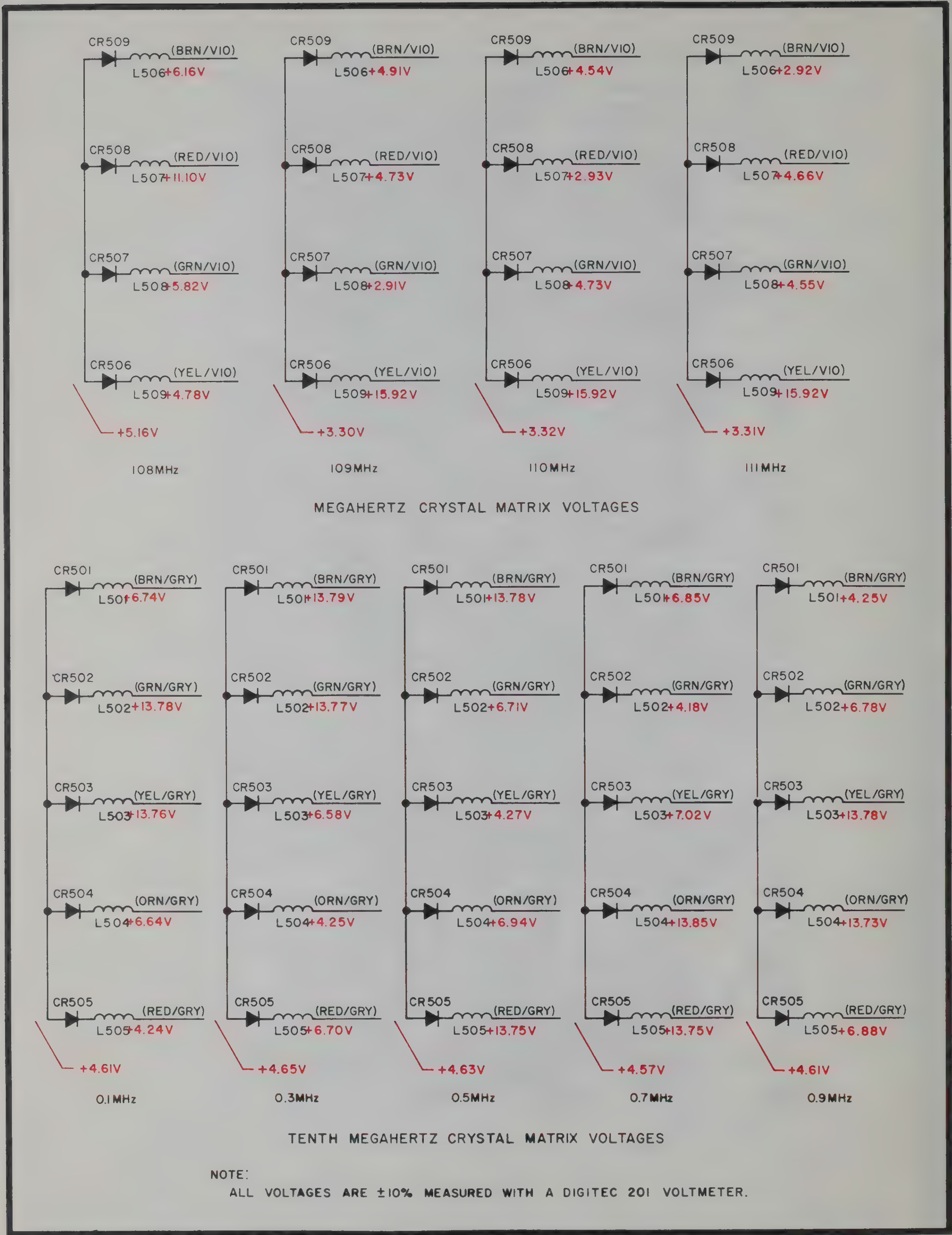


Figure 5-3. Cessna 800 Glideslope/Marker Beacon Receiver Crystal Matrix Voltage Measurements

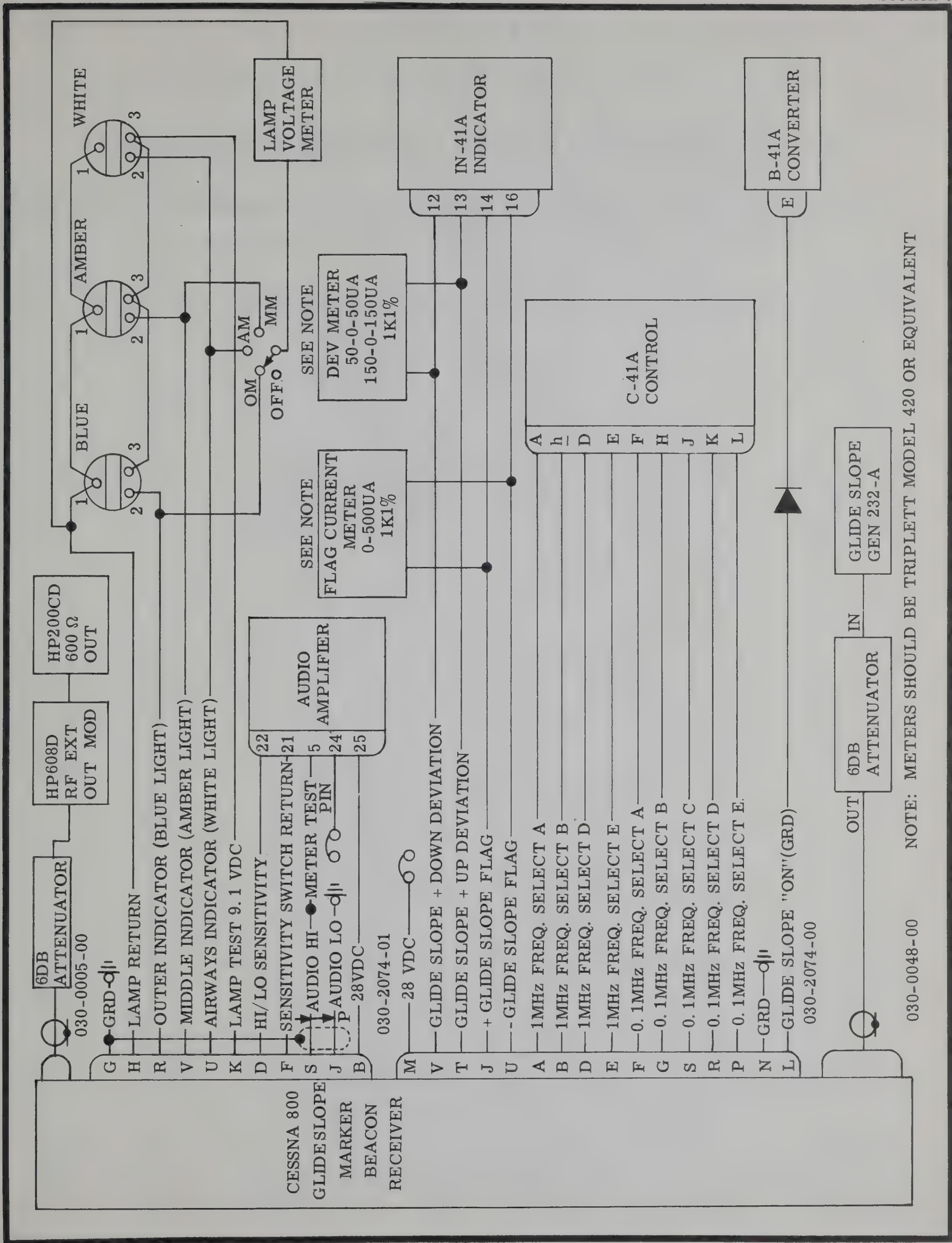


Figure 5-4. Cessna 800 Glideslope/Marker Beacon Receiver Test Set, Schematic Diagram

SECTION VI

PARTS LIST

ALWAYS INCLUDE THE MODEL NUMBER AND SERIAL NUMBER OF THE UNIT ALONG WITH THE PART NUMBER AND REFERENCE SYMBOL WITH YOUR ORDER.

MARKER BEACON RECEIVER SECTION		
REF. SYMBOL	DESCRIPTION	PART NUMBER
C101	Capacitor, Mylar, .047µf, 200V, 10%	105-0018-74
C102	Capacitor, Tantalum, 15µf, 20V, 20%	096-1036-00
C103	Capacitor, Tantalum, 15µf, 20V 20%	096-1036-00
C111	Capacitor, Mylar, .015µf, 50V, 20%	105-0030-00
C111	Capacitor, Mylar, 0.01µf, 80V, 10%	105-0031-32
C112	Capacitor, Mylar, .015µf, 50V, 20%	105-0030-00
C112	Capacitor, Mylar, 0.01µf, 80V, 10%	105-0031-32
C113	Capacitor, Mylar, .015µf, 50V, 20%	105-0030-00
C113	Capacitor, Mylar, 0.01µf, 80V, 10%	105-0031-32
C114	Capacitor, Mylar, .047µf, 80V, 10%	105-0031-56
C121	Capacitor, Mica, 50pf, 1%	104-0002-09
C122	Capacitor, Comp., 1pf, 10%	106-0001-01
C123	Capacitor, Mica, 50pf, 1%	104-0002-09
C124	Capacitor, Comp., 1pf, 10%	106-0001-01
C125	Capacitor, Mica, 50pf, 1%	104-0002-09
C126	Capacitor, Ceramic, 470pf, 400V, 20%, X5F	113-7471-00
C131	Capacitor, Ceramic, 27pf, 400V, 5%, N150	113-3270-00
C132	Capacitor, Ceramic, 1Kpf, 400V, 10%, X5F	113-5102-00
C133	Capacitor, Ceramic, 68pf, 400V, 10%, X5F	113-5680-00
C141	Capacitor, Mylar, .047µf, 80V, 10%	105-0031-56
C142	Capacitor, Mylar, .015µf, 50V, 20%	105-0030-00
C142	Capacitor, Mylar, 0.01µf, 80V, 10%	105-0031-32
C143	Capacitor, Mylar, .047µf, 80V, 10%	105-0031-56
C151	Capacitor, Mylar, .015µf, 50V, 20%	105-0030-00
C151	Capacitor, Mylar, 0.01µf, 80V, 10%	105-0031-32
C152	Capacitor, Mylar, .047µf, 80V, 10%	105-0031-56
C153	Capacitor, Mylar, .047µf, 80V, 10%	105-0031-56
C161	Capacitor, Mylar, .015µf, 50V, 20%	105-0030-00
C161	Capacitor, Mylar, 0.01µf, 80V, 10%	105-0031-32
C162	Capacitor, Mylar, .047µf, 80V, 10%	105-0031-56

MARKER BEACON RECEIVER SECTION		
REF. SYMBOL	DESCRIPTION	PART NUMBER
C163	Capacitor, Mylar, .047μf, 80V, 10%	105-0031-56
C171	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C171	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C172	Capacitor, Mylar, .047μf, 80V, 10%	105-0031-56
C173	Capacitor, Mylar, .047μf, 80V, 10%	105-0031-56
C181	Capacitor, Mylar, 1.2Kpf, 200V, 10%	105-0018-17
C182	Capacitor, Tantalum, 15μf, 20V, 20%	096-1036-00
C183	Capacitor, Tantalum, 15μf, 20V, 20%	096-1036-00
C184	Capacitor, Mylar, 0.1μf, 80V, 10%	105-0031-68
C191	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C191	Capacitor, Mylar, 0.015μf, 80V, 10%	105-0031-38
C192	Capacitor, Mylar, .0047μf, 200V, 5%	105-0018-39
C193	Capacitor, Tantalum, .33μf, 35V, 5%	096-1045-00
C201	Capacitor, Mylar, .033μf, 80V, 10%	105-0031-50
C202	Capacitor, Mylar, .01μf, 80V, 5%	105-0031-33
C203	Capacitor, Tantalum, .68μf, 35V, 5%	096-1044-00
C211	Capacitor, Mylar, .1μf, 80V, 10%	105-0031-68
C212	Capacitor, Mylar, .033μf, 80V, 5%	105-0031-51
C213	Capacitor, Tantalum, 2.2μf, 20V, 5%	096-1043-00
C221	Capacitor, Mylar, .001μf, 200V, 10%	105-0018-14
C222	Capacitor, Ceramic, 470pf, 400V, 20%, X5F	113-7471-00
C223	Capacitor, Mylar, 1.2Kpf, 200V, 10%	105-0018-17
C224	Capacitor, Tantalum, 6.8μf, 20V, 20%	096-1047-00
C225	Capacitor, Tantalum, 6.8μf, 20V, 20%	096-1047-00
C226	Capacitor, Ceramic, 470pf, 400V, 20%, X5F	113-7471-00
C231	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C231	Capacitor, Mylar, 0.015μf, 80V, 10%	105-0031-38
C232	Capacitor, Tantalum, 1.0μf, 35V, 20%	096-1005-00
C233	Capacitor, Ceramic, 470pf, 400V, 20%, X5F	113-7471-00
C241	Capacitor, Mylar, .033μf, 80V, 10%	105-0031-50
C242	Capacitor, Tantalum, 1.0μf, 35V, 20%	096-1005-00

MARKER BEACON RECEIVER SECTION		
REF. SYMBOL	DESCRIPTION	PART NUMBER
C243	Capacitor, Ceramic, 470pf, 400V, 20%, X5F	113-7471-00
C251	Capacitor, Mylar, .1μf, 80V, 10%	105-0031-68
C252	Capacitor, Tantalum, 2.2μf, 20V, 20%	096-1007-00
C253	Capacitor, Ceramic, 470pf, 400V, 20%, X5F	113-7471-00
C261	Capacitor, Tantalum, 100μf, 10V, 20%	096-1046-00
CR101	Diode, Silicon: Motorola IN4003	007-6025-00
CR102	Diode, Silicon, Zener: 6.2V, 1 watt Semcor	007-5011-00
CR111	Diode, Silicon: Diodes Inc. IN457A	007-6029-00
CR112	Diode, Silicon: Same as CR111	007-6029-00
CR141	Diode, Silicon: Same as CR111	007-6029-00
CR151	Diode, Silicon: Same as CR111	007-6029-00
CR161	Diode, Silicon: Same as CR111	007-6029-00
CR181	Diode, Germanium: Transitron IN277	007-6023-00
CR182	Diode, Germanium: Same as CR181	007-6023-00
CR183	Diode, Silicon: Same as CR111	007-6029-00
CR221	Diode, Silicon: Same as CR111	007-6029-00
CR222	Diode, Silicon: Same as CR111	007-6029-00
CR231	Diode, Germanium: Same as CR181	007-6023-00
CR241	Diode, Germanium: Same as CR181	007-6023-00
CR251	Diode, Germanium: Same as CR181	007-6023-00
FL101	Filter, Band-Pass, 4.6MHz	017-0010-00
J103	Connector, Coax	030-0013-00
L131	Inductor, 4 Turns, #16 Bus Wire	019-2075-00
L132	Inductor, 4 Turns, #16 Bus Wire	019-2075-00
L133	Inductor, 4 Turns, #16 Bus Wire	019-2075-00
L134	Inductor, .15μh, 10%	019-2055-06
Q101	Transistor, Silicon: NPN RCA 35839	007-0030-00
Q102	Transistor, Silicon: NPNS General Inst. 2N699	007-0042-00

MARKER BEACON RECEIVER SECTION		
REF. SYMBOL	DESCRIPTION	PART NUMBER
Q103	Transistor, Silicon: NPNS GE 2N2714 selected, blue dot	007-0026-03
Q111	Transistor, Silicon: NPNS GE 2N3854 selected, grey body	007-0036-00
Q112	Transistor, Silicon: Same as Q103	007-0026-03
Q113	Transistor, Silicon: Same as Q111	007-0036-00
Q141	Transistor, Silicon: Same as Q111	007-0036-00
Q151	Transistor, Silicon: Same as Q111	007-0036-00
Q161	Transistor, Silicon: Same as Q111	007-0036-00
Q171	Transistor, Silicon: Same as Q111	007-0036-00
Q181	Transistor, Silicon: Same as Q111	007-0036-00
Q191	Transistor, Silicon: PNPS Fairchild 2N3638	007-0047-00
Q192	Transistor, Silicon: NPNS GE 16B670 green body	007-0035-00
Q201	Transistor, Silicon: Same as Q191	007-0047-00
Q202	Transistor, Silicon: Same as Q192	007-0035-00
Q212	Transistor, Silicon: Same as Q191	007-0047-00
Q213	Transistor, Silicon: Same as Q192	007-0035-00
Q221	Transistor, Silicon: Same as Q192	007-0035-00
Q222	Transistor, Silicon: Same as Q191	007-0047-00
Q223	Transistor, Silicon: NPNS GE 2N3403	007-0039-00
Q224	Transistor, Silicon: Same as Q223	007-0039-00
Q231	Transistor, Silicon: Same as Q192	007-0035-00
Q232	Transistor, Silicon: Same as Q223	007-0039-00
Q241	Transistor, Silicon: Same as Q192	007-0035-00
Q242	Transistor, Silicon: Same as Q223	007-0039-00
Q251	Transistor, Silicon: Same as Q192	007-0035-00
Q252	Transistor, Silicon: Same as Q223	007-0039-00
R101	Resistor, Wire Wound, 10Ω, 5%, 5 watt	132-0076-00
R102	Resistor, Comp., 3.3KΩ, 10%, 1/4 watt	130-0332-25

MARKER BEACON RECEIVER SECTION		
REF. SYMBOL	DESCRIPTION	PART NUMBER
R103	Resistor, Comp., 470Ω, 10%, 1/4 watt	130-0471-25
R104	Resistor, Precision, 412Ω, 1%, 1/4 watt	136-4120-22
R104	Resistor, Precision, 412Ω, 1%, 1/8 watt	136-4120-22
R105	Resistor, Precision, 1.3KΩ, 1%, 1/4 watt	136-1301-22
R105	Resistor, Precision, 1.3KΩ, 1% 1/8 watt	136-1301-22
R106	Resistor, Comp., 470Ω, 10%, 1/4 watt	130-0471-25
R111	Resistor, Comp., 47Ω, 10%, 1/4 watt	130-0470-25
R112	Resistor, Comp., 10KΩ, 10%, 1/4 watt	130-0103-25
R113	Resistor, Comp., 2.7KΩ, 10%, 1/4 watt	130-0272-25
R114	Resistor, Comp., 15KΩ, 10%, 1/4 watt	130-0153-25
R115	Resistor, Comp., 22KΩ, 10%, 1/4 watt	130-0223-25
R116	Resistor, Comp., 15KΩ, 10%, 1/4 watt	130-0153-25
R117	Resistor, Comp., 47Ω, 10%, 1/4 watt	130-0470-25
R118	Resistor, Comp., 2.7KΩ, 10%, 1/4 watt	130-0272-25
R119	Resistor, Comp., 3.3KΩ, 10%, 1/4 watt	130-0332-25
R121	Resistor, Variable, 10KΩ, 20%, 3/4 watt	133-0035-03
R131	Resistor, Comp., 47Ω, 10%, 1/4 watt	130-0470-25
R132	Resistor, Comp., 2.2KΩ, 10%, 1/4 watt	130-0222-25
R133	Resistor, Comp., 470Ω, 10%, 1/4 watt	130-0471-25
R134	Resistor, Comp., 2.7KΩ, 10%, 1/4 watt	130-0272-25
R140	Resistor, Comp., 47Ω, 10%, 1/4 watt	130-0470-25
R141	Resistor, Comp., 330Ω, 10%, 1/4 watt	130-0331-25
R142	Resistor, Comp., 180Ω, 10%, 1/4 watt	130-0181-25
R143	Resistor, Comp., 5.6KΩ, 10%, 1/4 watt	130-0562-25
R144	Resistor, Comp., 1.8KΩ, 10%, 1/4 watt	130-0182-25
R146	Resistor, Comp., 3.3KΩ, 10%, 1/4 watt	130-0332-25
R147	Resistor, Comp., 10Ω, 10%, 1/4 watt	130-0100-25
R148	Resistor, Comp., 470Ω, 10%, 1/4 watt	130-0471-25
R151	Resistor, Comp., 5.6KΩ, 10%, 1/4 watt	130-0562-25
R152	Resistor, Comp., 47Ω, 10%, 1/4 watt	130-0470-25
R153	Resistor, Comp., 330Ω, 10%, 1/4 watt	130-0331-25

MARKER BEACON RECEIVER SECTION		
REF. SYMBOL	DESCRIPTION	PART NUMBER
R154	Resistor, Comp., 1.8KΩ, 10%, 1/4 watt	130-0182-25
R155	Resistor, Comp., 3.3KΩ, 10%, 1/4 watt	130-0332-25
R156	Resistor, Comp., 470Ω, 10%, 1/4 watt	130-0471-25
R161	Resistor, Comp., 5.6KΩ, 10%, 1/4 watt	130-0562-25
R162	Resistor, Comp., 47Ω, 10%, 1/4 watt	130-0470-25
R163	Resistor, Comp., 330Ω, 10%, 1/4 watt	130-0331-25
R164	Resistor, Comp., 1.8KΩ, 10%, 1/4 watt	130-0182-25
R165	Resistor, Comp., 3.3KΩ, 10%, 1/4 watt	130-0332-25
R166	Resistor, Comp., 470Ω, 10%, 1/4 watt	130-0471-25
R171	Resistor, Comp., 3.3KΩ, 10%, 1/4 watt	130-0332-25
R172	Resistor, Comp., 3.3KΩ, 10%, 1/4 watt	130-0332-25
R173	Resistor, Comp., 10Ω, 10%, 1/4 watt	130-0100-25
R174	Resistor, Comp., 330Ω, 10%, 1/4 watt	130-0331-25
R175	Resistor, Comp., 100Ω, 10%, 1/4 watt	130-0101-25
R181	Resistor, Comp., 10KΩ, 10%, 1/4 watt	130-0103-25
R182	Resistor, Comp., 1.5KΩ, 10%, 1/4 watt	130-0152-25
R183	Resistor, Comp., 220Ω, 10%, 1/4 watt	130-0221-25
R184	Resistor, Comp., 220Ω, 10%, 1/4 watt	130-0221-25
R185	Resistor, Comp., 2.2KΩ, 10%, 1/4 watt	130-0222-25
R186	Resistor, Comp., 820Ω, 5%, 1/4 watt	130-0821-23
R191	Resistor, Comp., 8.2KΩ, 5%, 1/4 watt	130-0822-23
R192	Resistor, Comp., 6.8KΩ, 10%, 1/4 watt	130-0682-25
R193	Resistor, Precision, 1.3KΩ, 1%, 1/4 watt	136-1301-22
R194	Resistor, Precision, 1.3KΩ, 1%, 1/4 watt	136-1301-22
R195	Resistor, Comp., 1KΩ, 10%, 1/4 watt	130-0102-25
R196	Resistor, Comp., 4.7KΩ, 10%, 1/4 watt	130-0472-25
R201	Resistor, Comp., 8.2KΩ, 5%, 1/4 watt	130-0822-23
R202	Resistor, Comp., 6.8KΩ, 10%, 1/4 watt	130-0682-25
R203	Resistor, Precision, 1.5KΩ, 1%, 1/4 watt	136-1501-22

MARKER BEACON RECEIVER SECTION		
REF. SYMBOL	DESCRIPTION	PART NUMBER
R204	Resistor, Precision, 1.5KΩ, 1%, 1/4 watt	136-1501-22
R205	Resistor, Comp., 1KΩ, 10%, 1/4 watt	130-0102-25
R206	Resistor, Comp., 4.7KΩ, 10%, 1/4 watt	130-0472-25
R211	Resistor, Comp., 8.2KΩ, 5%, 1/4 watt	130-0822-23
R212	Resistor, Comp., 6.8KΩ, 10%, 1/4 watt	130-0682-25
R213	Resistor, Precision, 1.5KΩ, 1%, 1/4 watt	136-1501-22
R214	Resistor, Precision, 1.5KΩ, 1%, 1/4 watt	136-1501-22
R215	Resistor, Comp., 1KΩ, 10%, 1/4 watt	130-0102-25
R216	Resistor, Comp., 4.7KΩ, 10%, 1/4 watt	130-0472-25
R221	Resistor, Comp., 680Ω, 10%, 1/4 watt	130-0681-25
R222	Resistor, Comp., 6.8KΩ, 10%, 1/4 watt	130-0682-25
R223	Resistor, Comp., 330Ω, 10%, 1/4 watt	130-0331-25
R224	Resistor, Comp., 470Ω, 10%, 1/4 watt	130-0471-25
R225	Resistor, Comp., 470Ω, 10%, 1/4 watt	130-0471-25
R226	Resistor, Comp., 2.2KΩ, 10%, 1/4 watt	130-0222-25
R227	Resistor, Comp., 22KΩ, 10%, 1/4 watt	130-0223-25
R228	Resistor, Variable, 10KΩ, 20%, 3/4 watt	133-0037-00
R229	Resistor, Comp., 1.8KΩ, 10%, 1/4 watt	130-0182-25
R251	Resistor, Comp., 15KΩ, 10%, 1/4 watt	130-0153-25
RT111	Thermistor, 100Ω, +25°C, 10%	134-1005-00
RT181	Thermistor, 100Ω, +25°C, 10%	134-1005-00
T261	Transformer, Audio	019-5037-00
Y131	Crystal, Quartz, 70.4MHz	044-0007-00
R231	Resistor, Comp., 270Ω, 10%, 1/4 watt	130-0271-25
R232	Resistor, Variable, 1KΩ, 20%, 3/4 watt	133-0035-01

GLIDESLOPE RECEIVER SECTION		
REF. SYMBOL	DESCRIPTION	PART NUMBER
C301	Capacitor, Ceramic, 4.7pf, 400V, .5% N150	113-3047-00
C302	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C302	Capacitor, Mylar, 680pf, 400V, 10% XF5	113-5681-00
C303	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C303	Capacitor, Mylar, 680pf, 400V, 10% XF5	113-5681-00
C304	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C304	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C305	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C305	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C306	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C306	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C307	Capacitor, Mylar, .015μf. 50V, 20%	105-0030-00
C307	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C308	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C308	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C309	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C309	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C310	Capacitor, Ceramic, 6.8pf, 400V, 15%, N150	113-3068-00
C311	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C311	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C312	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C312	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C313	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C313	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C314	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C314	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C315	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C315	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C316	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C316	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C317	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C317	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C318	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C318	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C319	Capacitor, Tantalum, 68μf, 15V, 20%	096-1042-00
C321	Capacitor, Ceramic, 220pf, 400V, 5%, X5F	113-3221-00
C322	Capacitor, Ceramic, 330pf, 400V, 10% X5F	113-5331-00
C323	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C323	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C324	Capacitor, Ceramic, 100pf, 400V, 10%, X5F	113-5101-01
C325	Capacitor, Ceramic, 100pf, 400V, 10%, X5F	113-5101-01
C326	Capacitor, Ceramic, 47pf, 400V, 5%, X5F	113-3470-00
C327	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C327	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C331	Capacitor, Electrolytic, 30μf, -10%, 100V, 50%	097-0052-00
C332	Capacitor, Tantalum, 2.2μf, 50V, 20%	096-1031-00
C333	Capacitor, Feed-Thru, 3Kpf, GMV, 500V, X5U	106-0013-00
C334	Capacitor, Feed-Thru, 3Kpf, GMV, 500V, X5U	106-0013-00
C335	Capacitor, Ceramic, 10pf, 400V, .5%, N150	113-3100-00
C336	Capacitor, Ceramic, 15pf, 400V, .5%, N150	113-3150-00
C337	Capacitor, Trimmer, 1-10pf	102-0070-02
C338	Capacitor, FeedThru, 3Kpf, GMV, 500V, X5U	106-0013-00

GLIDESLOPE RECEIVER SECTION		
REF. SYMBOL	DESCRIPTION	PART NUMBER
C339	Capacitor, Feed-Thru, 3Kpf, GMV, 500V, X5U	106-0013-00
C340	Capacitor, Ceramic, 2.2μf, 400V, 10%, N150	113-5002-00
C341	Capacitor, Ceramic, 8.2pf, 400V, .5%, N150	113-3082-00
C342	Capacitor, Trimmer, 1-10pf	102-0070-02
C343	Capacitor, Feed-Thru, 3Kpf, GMV, 500V, X5U	106-0013-00
C350	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C350	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C351	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C351	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C352	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C352	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C353	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C353	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C354	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C354	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C355	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C355	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C356	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C356	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C357	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C357	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C358	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C358	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C359	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C359	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C361	Capacitor, Ceramic, 150 pf, 400V, 10%, X5F	113-5151-01
C362	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C362	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C363	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C363	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C364	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C364	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C365	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C365	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C366	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C366	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C367	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C367	Capacitor, Mylar, 0.01μf, 80V, 10%	105-0031-32
C368	Capacitor, Tantalum, .22μf, 35V, 20%	096-1013-00
C369	Capacitor, Tantalum, 1.0μf, 35V, 20%	096-1005-00
C371	Capacitor, Tantalum, 15μf, 20V, 20%	096-1036-00
C372	Capacitor, Tantalum, 150μf, 15V, 20%	096-1035-00
C373	Capacitor, Tantalum, 47μf, 20V, 20%	096-1024-00
C374	Capacitor, Tantalum, 47μf, 20V, 20%	096-1024-00
C375	Capacitor, Tantalum, 47μf, 20V, 20%	096-1024-00
C376	Capacitor, Electrolytic, 620μf, 3V, -10%, 35%	097-0053-00
C377	Capacitor, Electrolytic, 620μf, 3V, -10%, 35%	097-0053-00

GLIDESLOPE RECEIVER SECTION		
REF. SYMBOL	DESCRIPTION	PART NUMBER
C378	Capacitor, Electrolytic, 620μf, 3V, -10%, 35%	097-0053-00
C379	Capacitor, Ceramic, 1Kpf, 400V, 10%, X5F	113-5102-00
C381	Capacitor, Ceramic, 1Kpf, 400V, 10%, X5F	113-5102-00
C382	Capacitor, Mylar, .015μf, 50V, 20%	105-0030-00
C382	Capacitor, Mylar, 0.01μf, 80V, 20%	105-0031-32
CR301	Diode, Germanium: Sylvania D6642	007-6017-00
CR302	Diode, Silicon: Diodes Inc. IN457A	007-6029-00
CR303	Diode, Silicon: Same as CR302	007-6029-00
CR304	Diode, Germanium: Same as CR301	007-6017-00
CR305	Diode, Silicon: Motorola IN4003	007-6025-00
CR306	Diode, Silicon, Zener: Semcor, 6.2V, 1 watt	007-5011-00
CR307	Diode, Silicon: Same as CR302	007-6029-00
CR308	Diode, Germanium: Transitron IN277	007-6023-00
CR309	Diode, Germanium: Same as CR309	007-6023-00
CR310	Diode, Silicon: Same as CR302	007-6029-00
CR311	Diode, Germanium: Same as CR308	007-6023-00
CR312	Diode, Germanium: Same as CR308	007-6023-00
CR313	Diode, Germanium: Same as CR308	007-6023-00
CR314	Diode, Germanium: Same as CR308	007-6023-00
CR315	Diode, Silicon: Same as CR302	007-6029-00
CR316	Diode, Silicon: Same as CR302	007-6029-00
CR317	Diode, Silicon: Same as CR302	007-6029-00
CR318	Diode, Silicon: Same as CR302	007-6029-00
CR319	Diode, Silicon: Same as CR302	007-6029-00
CR320	Diode, Silicon: Same as CR302	007-6029-00
CR321	Diode, Silicon: Same as CR302	007-6029-00
CR322	Diode, Silicon: Same as CR302	007-6029-00
CR323	Diode, Silicon: Same as CR302	007-6029-00
CR324	Diode, Silicon: Same as CR302	007-6029-00
CR325	Diode, Silicon: Same as CR302	007-6029-00
FL301	Filter, Band-Pass, 22MHz	017-0012-00
FL302	Filter, 90 and 150 Hz	017-0009-00

GLIDESLOPE RECEIVER SECTION		
REF. SYMBOL	DESCRIPTION	PART NUMBER
J302	Connector, Recptacle	030-2072-00
L301	Inductor, 15μh	019-2055-06
L302	Inductor, 3. 3μh	019-2055-22
L303	Inductor, 47μh, 5%	019-2057-36
L304	Inductor, 12μh, 10%	019-2058-25
L305	Inductor, . 68μh, 10%	019-2055-14
L306	0. 50 inches #24 Buss Wire	NO KPN
L307	Inductor, . 09μh	019-2017-00
L308	Inductor, . 09μh	019-2017-00
L309	Inductor, . 15μh	019-2055-06
L311	Inductor, 22μh, 10%	019-2055-32
Q301	Transistor, Silicon: NPNS, GE 2N3854A, selected, grey body	007-0036-00
Q302	Transistor, Silicon: Same as Q301	007-0036-00
Q303	Transistor, Silicon: Same as Q301	007-0036-00
Q304	Transistor, Silicon: Same as Q301	007-0036-00
Q305	Transistor, Silicon: NPNS, Fairchild 2N3564	007-0055-00
Q306	Transistor, Silicon: Same as Q301	007-0036-00
Q307	Transistor, Silicon: NPN, RCA 35839	007-0030-00
Q308	Transistor, Silicon: NPNS, General Inst. 2N699	007-0042-00
Q309	Transistor, Silicon: NPNS, GE 16B670, selected green body	007-0035-00
Q310	Transistor, Silicon: NPNS, GE 2N2714, selected, blue dot	007-0026-00
Q311	Transistor, Silicon: Same as Q310	007-0026-03
Q312	Transistor, Silicon: Same as Q310	007-0026-03
Q313	Transistor, Silicon: Same as Q310	007-0026-03
Q314	Transistor, Silicon: Same as Q301	007-0036-00
Q315	Transistor, Silicon: PNPS, Fairchild 2N3638	007-0047-00
Q316	Transistor, Silicon: NPNS, GE 16B670, selected, green body	007-0035-00
Q317	Transistor, Silicon: NPNS, GE 3403	007-0039-00
R301	Resistor, Comp., 2. 7KΩ, 10%, 1/4 watt	130-0272-25

GLIDESLOPE RECEIVER SECTION		
REF. SYMBOL	DESCRIPTION	PART NUMBER
R302	Resistor, Comp., 820Ω, 10%, 1/4 watt	130-0821-25
R303	Resistor, Comp., 470Ω, 10%, 1/4 watt	130-0471-25
R304	Resistor, Comp., 56Ω, 10%, 1/4 watt	130-0560-25
R305	Resistor, Comp., 10Ω, 10%, 1/4 watt	130-0100-25
R306	Resistor, Comp., 100Ω, 10%, 1/4 watt	130-0101-25
R307	Resistor, Comp., 10KΩ, 10%, 1/4 watt	130-0103-25
R308	Resistor, Comp., 10KΩ, 10%, 1/4 watt	130-0103-25
R309	Resistor, Comp., 10KΩ, 10%, 1/4 watt	130-0103-25
R311	Resistor, Comp., 470Ω, 10%, 1/4 watt	130-0471-25
R312	Resistor, Comp., 2.7KΩ, 10%, 1/4 watt	130-0272-25
R313	Resistor, Comp., 820Ω, 10%, 1/4 watt	130-0821-25
R314	Resistor, Comp., 5.1Ω, 5%, 1/4 watt	130-0051-23
R315	Resistor, Comp., 100Ω, 10%, 1/4 watt	130-0101-25
R316	Resistor, Comp., 56Ω, 10%, 1/4 watt	130-0560-25
R317	Resistor, Comp., 10KΩ, 10%, 1/4 watt	130-0103-25
R318	Resistor, Comp., 10KΩ, 10%, 1/4 watt	130-0103-25
R319	Resistor, Comp., 10KΩ, 10%, 1/4 watt	130-0103-25
R321	Resistor, Comp., 56Ω, 10%, 1/4 watt	130-0560-25
R322	Resistor, Comp., 470Ω, 10%, 1/4 watt	130-0471-25
R323	Resistor, Comp., 27KΩ, 10%, 1/4 watt	130-0272-25
R324	Resistor, Comp., 820Ω, 10%, 1/4 watt	130-0821-25
R325	Resistor, Comp., 5.1Ω, 5%, 1/4 watt	130-0051-23
R326	Resistor, Comp., 100Ω, 10%, 1/4 watt	130-0101-25
R331	Resistor, Comp., 120Ω, 10%, 1/4 watt	130-0121-25
R332 R332	Resistor, Comp., 5.6KΩ, 10%, 1/4 watt Resistor, Comp., 2KΩ, 5%, 1/4 watt	130-0562-25 130-0202-23
R333	Resistor, Comp., 2KΩ, 5%, 1/4 watt	130-0202-23
R334 R334	Resistor, Comp., 1KΩ, 10%, 1/4 watt Resistor, Comp., 470Ω, 10%, 1/4 watt	130-0102-25 130-0471-25
R335	Resistor, Comp., 5.6Ω, 10%, 1 watt	130-0056-45

GLIDESLOPE RECEIVER SECTION		
REF. SYMBOL	DESCRIPTION	PART NUMBER
R336	Resistor, Comp., 2.7KΩ, 10%, 1/2 watt	130-0272-35
R337	Resistor, Comp., 1.2KΩ, 10%, 1/2 watt	130-0122-35
R338	Resistor, Comp., 1.2KΩ, 5%, 1/2 watt	130-0122-33
R339	Resistor, Comp., 2.7KΩ, 5%, 1/4 watt	130-0272-23
R340	Resistor, Comp., Selected	
R341	Resistor, Precision, 1.5KΩ, 1%, 1/8 watt	136-1501-22
R343	Resistor, Comp., 470Ω, 10%, 1/4 watt	130-0471-25
R344	Resistor, Comp., 56Ω, 10%, 1/4 watt	130-0560-25
R345	Resistor, Comp., 10KΩ, 10%, 1/4 watt	130-0103-25
R346	Resistor, Comp., 180Ω, 10%, 1/4 watt	130-0181-25
R347	Resistor, Comp., 1KΩ, 10%, 1/4 watt	130-0102-25
R348	Resistor, Comp., 51Ω, 5%, 1/4 watt	130-0510-23
R349	Resistor, Comp., 430Ω, 5%, 1/4 watt	130-0431-23
R351	Resistor, Comp., 2.7KΩ, 10%, 1/4 watt	130-0272-25
R352	Resistor, Comp., 2.2KΩ, 10%, 1/4 watt	130-0222-25
R361	Resistor, Comp., 120Ω, 10%, 1/4 watt	130-0121-25
R362	Resistor, Comp., 470Ω, 10%, 1/4 watt	130-0471-25
R363	Resistor, Comp., 2.7KΩ, 10%, 1/4 watt	130-0272-25
R364	Resistor, Comp., 820Ω, 10%, 1/4 watt	130-0821-25
R365	Resistor, Comp., 5.1Ω, 5%, 1/4 watt	130-0051-23
R366	Resistor, Comp., 100Ω, 10%, 1/4 watt	130-0101-25
R367	Resistor, Comp., 10KΩ, 10%, 1/4 watt	130-0103-25
R368	Resistor, Comp., 10KΩ, 10%, 1/4 watt	130-0103-25
R369	Resistor, Comp., 10KΩ, 10%, 1/4 watt	130-0103-25
R371	Resistor, Comp., 120Ω, 10%, 1/4 watt	130-0121-25
R372	Resistor, Comp., 470Ω, 10%, 1/4 watt	130-0471-25
R373	Resistor, Comp., 2.7KΩ, 10%, 1/4 watt	130-0272-25
R374	Resistor, Comp., 820Ω, 10%, 1/4 watt	130-0821-25
R375	Resistor, Comp., 5.1Ω, 5%, 1/4 watt	130-0051-23

GLIDESLOPE RECEIVER SECTION		
REF. SYMBOL	DESCRIPTION	PART NUMBER
R376	Resistor, Comp., 100Ω, 10%, 1/4 watt	130-0101-25
R377	Resistor, Comp., 120Ω, 10%, 1/4 watt	130-0121-25
R378	Resistor, Comp., 470Ω, 10%, 1/4 watt	130-0471-25
R379	Resistor, Comp., 2.7KΩ, 10%, 1/4 watt	130-0272-25
R381	Resistor, Comp., 820Ω, 10%, 1/4 watt	130-0821-25
R382	Resistor, Comp., 5.1Ω, 5%, 1/4 watt	130-0051-23
R383	Resistor, Comp., 100Ω, 10%, 1/4 watt	130-0101-25
R384	Resistor, Comp., 120Ω, 10%, 1/4 watt	130-0121-25
R385	Resistor, Comp., 470Ω, 10%, 1/4 watt	130-0471-25
R386	Resistor, Comp., 2.7KΩ, 10%, 1/4 watt	130-0272-25
R387	Resistor, Comp., 820Ω, 10%, 1/4 watt	130-0821-25
R388	Resistor, Comp., 5.1Ω, 5%, 1/4 watt	130-0051-23
R389	Resistor, Comp., 100Ω, 10%, 1/4 watt	130-0101-25
R391	Resistor, Comp., 27KΩ, 10%, 1/4 watt	130-0273-25
R392	Resistor, Comp., 4.7KΩ, 10%, 1/4 watt	130-0472-25
R393	Resistor, Comp., 1KΩ, 10%, 1/4 watt	130-0102-25
R394	Resistor, Comp., 10KΩ, 10%, 1/4 watt	130-0103-25
R395	Resistor, Comp., 2.2KΩ, 10%, 1/4 watt	130-0222-25
R396	Resistor, Variable, 2.5KΩ, 20%, 1/2 watt	133-0035-00
R397	Resistor, Comp., 220Ω, 10%, 1/4 watt	130-0221-25
R398	Resistor, Variable, 2.5KΩ, 20%, 1/2 watt	133-0035-00
R399	Resistor, Comp., 4.7KΩ, 10%, 1/4 watt	130-0472-25
RT301	Thermistor, 1KΩ @+25°C, 10%	134-1004-00
Y301	Crystal, Quartz, 25.0MHz	044-0005-00
R401	Resistor, Comp., 33KΩ, 10%, 1/4 watt	130-0333-25
R402	Resistor, Comp., 3.3KΩ, 10%, 1/4 watt	130-0332-25
R403	Resistor, Comp., 1.2KΩ, 10%, 1/4 watt	130-0122-25
R404	Resistor, Comp., 120Ω, 10%, 1/4 watt	130-0121-25
R405	Resistor, Comp., 68KΩ, 10%, 1/4 watt	130-0683-25
R406	Resistor, Comp., 8.2KΩ, 10%, 1/4 watt	130-0822-25
R407	Resistor, Comp., 820Ω, 10%, 1/4 watt	130-0821-25
R408	Resistor, Comp., 47Ω, 10%, 1/4 watt	130-0470-25

GLIDESLOPE RECEIVER SECTION		
REF. SYMBOL	DESCRIPTION	PART NUMBER
R409	Resistor, Comp., 33Ω, 10%, 1/4 watt	130-0330-25
R411	Resistor, Variable, 100Ω, 20%, 1/2 watt	133-0035-02
R412	Resistor, Variable, 1KΩ, 20%, 1/2 watt	133-0035-01
R413	Resistor, Precision, 412Ω, 1%, 1/4 watt	136-4120-22
R414	Resistor, Precision, 412Ω, 1%, 1/4 watt	136-4120-22
R415	Resistor, Comp., 1KΩ, 10%, 1/4 watt	130-0102-25
R416	Resistor, Comp., 1KΩ, 10%, 1/4 watt	130-0102-25
R417	Resistor, Comp., 1KΩ, 10%, 1/4 watt	130-0102-25
R418	Resistor, Comp., 1KΩ, 10%, 1/4 watt	130-0102-25
R419	Resistor, Comp., 1KΩ, 10%, 1/4 watt	130-0102-25
R421	Resistor, Comp. 1KΩ, 10%, 1/4 watt	130-0102-25
R422	Resistor, Comp., 1KΩ, 10%, 1/4 watt	130-0102-25
R423	Resistor, Comp., 1KΩ, 10%, 1/2 watt	130-0102-35
R423	Resistor, Comp., 560Ω, 5%, 1/2 watt	130-0561-33
R424	Resistor, Comp., 820Ω, 5%, 1/4 watt	130-0821-23
R425	Resistor, Comp., 820Ω, 5%, 1/4 watt	130-0821-23
R426	Resistor, Comp., 1KΩ, 10%, 1/2 watt	130-0102-35
R426	Resistor, Comp., 560Ω, 5%, 1/2 watt	130-0561-33
R427	Resistor, Comp., 820Ω, 5%, 1/4 watt	130-0821-23
R428	Resistor, Comp., 820Ω, 5%, 1/4 watt	130-0821-23
R429	Resistor, Comp., 1KΩ, 10%, 1/2 watt	130-0102-35
R429	Resistor, Comp., 560Ω, 5%, 1/2 watt	130-0561-33
R431	Resistor, Comp., 820Ω, 5%, 1/4 watt	130-0821-23
R432	Resistor, Comp., 820Ω, 5%, 1/4 watt	130-0821-23
R433	Resistor, Comp., 1KΩ, 10%, 1/2 watt	130-0102-35
R433	Resistor, Comp., 560Ω, 5%, 1/2 watt	130-0561-33
R434	Resistor, Comp., 820Ω, 5%, 1/4 watt	130-0821-23
R435	Resistor, Comp., 820Ω, 5%, 1/4 watt	130-0821-23
R436	Resistor, Comp., 1KΩ, 1/2 watt	130-0102-35
R436	Resistor, Comp., 560Ω, 5%, 1/2 watt	130-0561-33
R437	Resistor, Comp., 820Ω, 5%, 1/4 watt	130-0821-23
R438	Resistor, Comp., 820Ω, 5%, 1/4 watt	130-0821-23
R439	Resistor, Comp., 390Ω, 10%, 1 watt	130-0391-45
R441	Resistor, Comp., 820Ω, 5%, 1/4 watt	130-0821-23

GLIDESLOPE RECEIVER SECTION		
REF. SYMBOL	DESCRIPTION	PART NUMBER
R442	Resistor, Comp., 820Ω, 5%, 1/4 watt	130-0821-23
R443	Resistor, Comp., 390Ω, 10%, 1 watt	130-0391-45
R444	Resistor, Comp., 820Ω, 5%, 1/4 watt	130-0821-23
R445	Resistor, Comp., 820Ω, 5%, 1/4 watt	130-0821-23
R446	Resistor, Comp., 390Ω, 10%, 1 watt	130-0391-45
R447	Resistor, Comp., 820Ω, 5%, 1/4 watt	130-0821-23
R448	Resistor, Comp., 820Ω, 5%, 1/4 watt	130-0821-23
R449	Resistor, Comp., 390Ω, 5%, 1/4 watt	130-0391-23
R451	Resistor, Comp., 10KΩ, 10%, 1/4 watt	130-0103-25
C501	Capacitor, Feed-Thru, 1.5Kpf, 25V, 20%	106-0018-01
C502	Capacitor, Feed-Thru, 1.5Kpf, 25V, 20%	106-0018-01
C503	Capacitor, Feed-Thru, 1.5Kpf, 25V, 20%	106-0018-01
C504	Capacitor, Feed-Thru, 1.5Kpf, 25V, 20%	106-0018-01
C505	Capacitor, Feed-Thru, 1.5Kpf, 25V, 20%	106-0018-01
C506	Capacitor, Feed-Thru, 1.5Kpf, 25V, 20%	106-0018-01
C507	Capacitor, Feed-Thru, 1.5Kpf, 25V, 20%	106-0018-01
C508	Capacitor, Feed-Thru, 1.5Kpf, 25V, 20%	106-0018-01
C509	Capacitor, Feed-Thru, 1.5Kpf, 25V, 20%	106-0018-01
C510	Capacitor, Ceramic, 680pf, 400V, 10%, X5F	113-5681-00
C511	Capacitor, Feed-Thru, 1.5Kpf, 25V, 20%	106-0018-01
C512	Capacitor, Feed-Thru, 1.5Kpf, 25V, 20%	106-0018-01
C551	Capacitor, Ceramic, 2.7pf, ±.25pf, N150	113-3027-00
C552	Capacitor, Ceramic, ±.5pf, N150	113-3100-00
C553	Capacitor, Trimmer, 1-10pf	102-0020-02
C554	Capacitor, Trimmer, 1-10pf	102-0020-02
C555	Capacitor, Ceramic, 10pf, ±.5pf, N150	113-3100-00
C556	Capacitor, Composition, .75pf, 10%	106-0001-12
C557	Capacitor, Ceramic, 10pf, ±.5pf	113-3100-00
C558	Capacitor, Trimmer, 1-10pf	102-0020-02

GLIDE SLOPE RECEIVER SECTION		
REF. SYMBOL	DESCRIPTION	PART NUMBER
C559	Capacitor, Ceramic, 12pf, 5%, N150	113-3120-00
C560	Capacitor, Trimmer, 1-10pf	102-0020-02
CR501	Diode, Germanium: Transitron IN277	007-6023-00
CR502	Diode, Germanium: Same as CR501	007-6023-00
CR503	Diode, Germanium: Same as CR501	007-6023-00
CR504	Diode, Germanium: Same as CR501	007-6023-00
CR505	Diode, Germanium: Same as CR501	007-6023-00
CR506	Diode, Germanium: Same as CR501	007-6023-00
CR507	Diode, Germanium: Same as CR501	007-6023-00
CR508	Diode, Germanium: Same as CR501	007-6023-00
CR509	Diode, Germanium: Same as CR501	007-6023-00
J301	Receptacle, Connector MB	030-0047-00
L501	Inductor, 3.3μh, 10%	019-2055-22
L502	Inductor, 3.3μh, 10%	019-2055-22
L503	Inductor, 3.3μh, 10%	019-2055-22
L504	Inductor, 3.3μh, 10%	019-2055-22
L505	Inductor, 3.3μh, 10%	019-2055-22
L506	Inductor, 3.3μh, 10%	019-2055-22
L507	Inductor, 3.3μh, 10%	019-2055-22
L508	Inductor, 3.3μh, 10%	019-2055-22
L509	Inductor, 3.3μh, 10%	019-2055-22
L510	Inductor, .22μh, 10%	019-2055-08
L551	Inductor, 0.2 Ft., #22 Buss Wire	026-0003-00
L552	Inductor, 0.2 Ft., #22 Buss Wire	026-0003-00
L553	Inductor, 0.2 Ft., #22 Buss Wire	026-0003-00
L554	Inductor, 0.2 Ft., #22 Buss Wire	026-0003-00

GLIDESLOPE RECEIVER SECTION		
REF. SYMBOL	DESCRIPTION	PART NUMBER
R501	Resistor, Comp., 1.2KΩ, 5%, 1/4 watt	130-0122-23
R502	Resistor, Comp., 1.2KΩ, 5%, 1/4 watt	130-0152-23
Y501	Crystal, Quartz, 102.433MHz	044-0006-00
Y502	Crystal, Quartz, 103.933MHz	044-0006-15
Y503	Crystal, Quartz, 102.933MHz	044-0006-05
Y504	Crystal, Quartz, 103.033MHz	044-0006-06
Y505	Crystal, Quartz, 102.833MHz	044-0006-04
Y506	Crystal, Quartz, 103.733MHz	044-0006-13
Y507	Crystal, Quartz, 102.733MHz	044-0006-03
Y508	Crystal, Quartz, 103.833MHz	044-0006-14
Y509	Crystal, Quartz, 102.633MHz	044-0006-02
Y510	Crystal, Quartz, 103.533MHz	044-0006-11
Y511	Crystal, Quartz, 102.533MHz	044-0006-01
Y512	Crystal, Quartz, 103.633MHz	044-0006-12
Y513	Crystal, Quartz, 104.033MHz	044-0006-16
Y514	Crystal, Quartz, 103.333MHz	044-0006-09
Y515	Crystal, Quartz, 104.333MHz	044-0006-19
Y516	Crystal, Quartz, 103.433MHz	044-0006-10
Y517	Crystal, Quartz, 104.233MHz	044-0006-18
Y518	Crystal, Quartz, 103.133MHz	044-0006-07
Y519	Crystal, Quartz, 104.133MHz	044-0006-17
Y520	Crystal, Quartz, 103.233MHz	044-0006-08

CESSNA 800 GLIDESLOPE/MARKER BEACON RECEIVER INSTALLATION AND BENCH TEST KITS		
QTY.	DESCRIPTION	PART NUMBER
	050-1068-00, GLIDESLOPE RECEIVER INSTALLATION KIT	
1	Connector, Co-Ax, MB 45000	030-0048-00
1	Connector, 19 Pin	030-2074-00
1	Rack Assembly	071-4004-00
	050-1067-00, MARKER BEACON RECEIVER INSTALLATION KIT	
1	Connector, Co-Ax, BNC, UG-88/U	030-0005-00
1	Connector, 19 Pin	030-2074-01
1	Rack Assembly	071-4004-00
	050-1069-00, CESSNA 800 GLIDESLOPE/MARKER BEACON RECEIVER INSTALLATION KIT	
1	Connector, Co-Ax, BNC, UG-88/U	030-0005-00
1	Connector, 19 Pin	030-2074-00
1	Connector, Co-Ax, MB 45000	030-0048-00
1	Connector, 19 Pin	030-2074-01
1	Rack Assembly	071-4004-00
	050-1105-00, CESSNA 800 GLIDESLOPE/MARKER BEACON RECEIVER BENCH TEST KIT	
1	Connector, Co-Ax, BNC, UG-88/U	030-0005-00
1	Connector, Co-Ax, MB 45000	030-0048-00
1	Connector, 55 Pin	030-2073-00
1	Connector, 19 Pin	030-2074-00
1	Connector, 19 Pin	030-2074-01
1	Deviation Meter, 50-0-50μa, 1000Ω, 1%, 1μa graduations and 150-0-150μa, 1000Ω, 1%, 3μa graduations (or provision for padding 50-0-50 meter to 150-0-150 See note below). NOTE: To increase the range of the Deviation Meter to 150-0-150μa, connect a 2KΩ, 1% resistor in series with the meter movement. Connect a 1. 5KΩ, 1% resistor in parallel with the 2KΩ resistor and meter movement. The two resistors should be connected such that both resistors may be switched "into" or "out" of the meter movement circuit.	Ref. Triplett #420
1	Flag Meter, 0-500μa, 1000Ω, 1%, 10 a graduations	Ref. Triplett #420
1	Lamp Voltage Meter, 0-10vdc, 1000Ω, 1 Volt, 0. 2V	Ref. Simpson #1227

SECTION VII

DIAGRAMS AND ILLUSTRATIONS

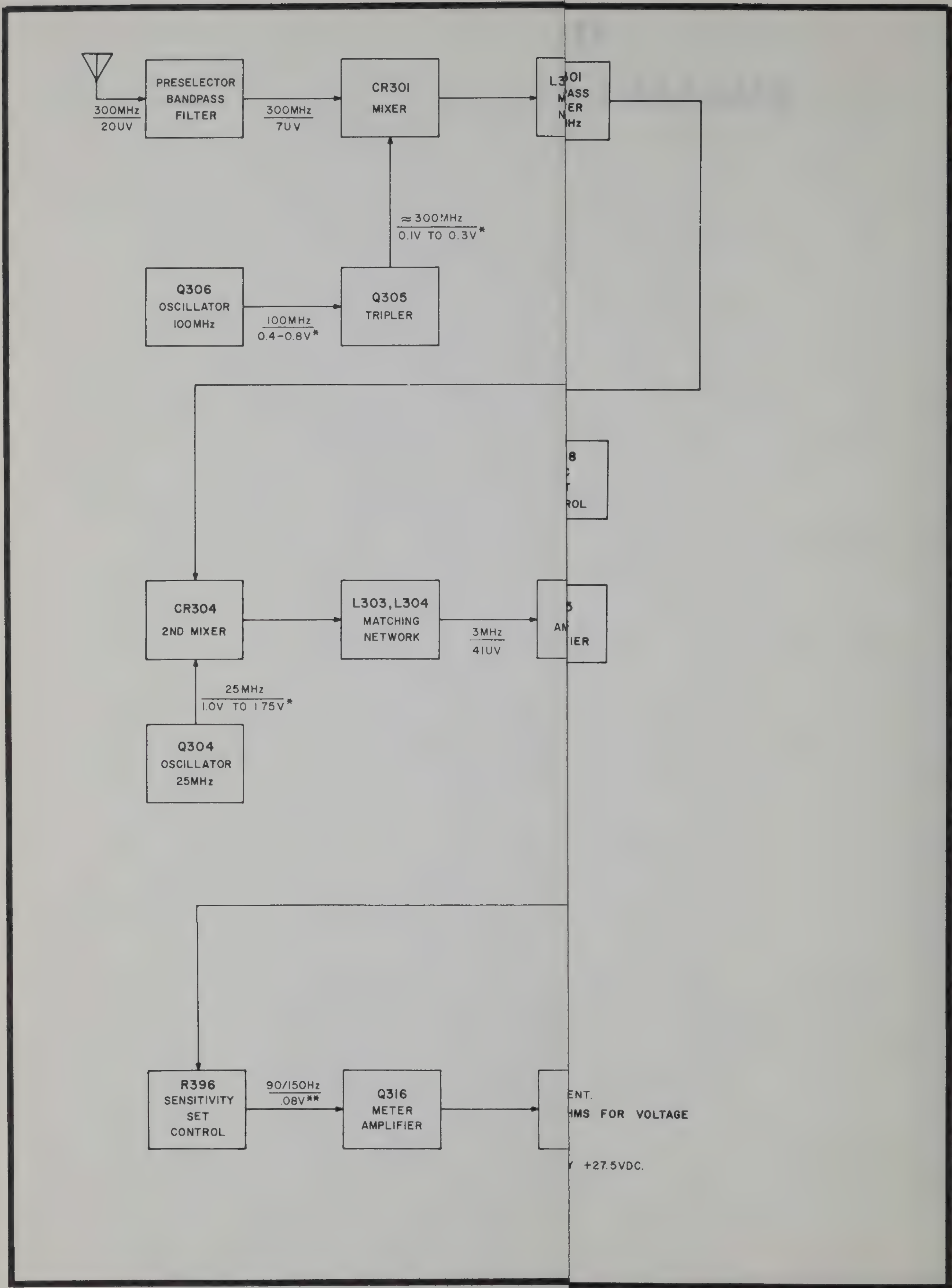


Figure 7-1. Glideslope Receive

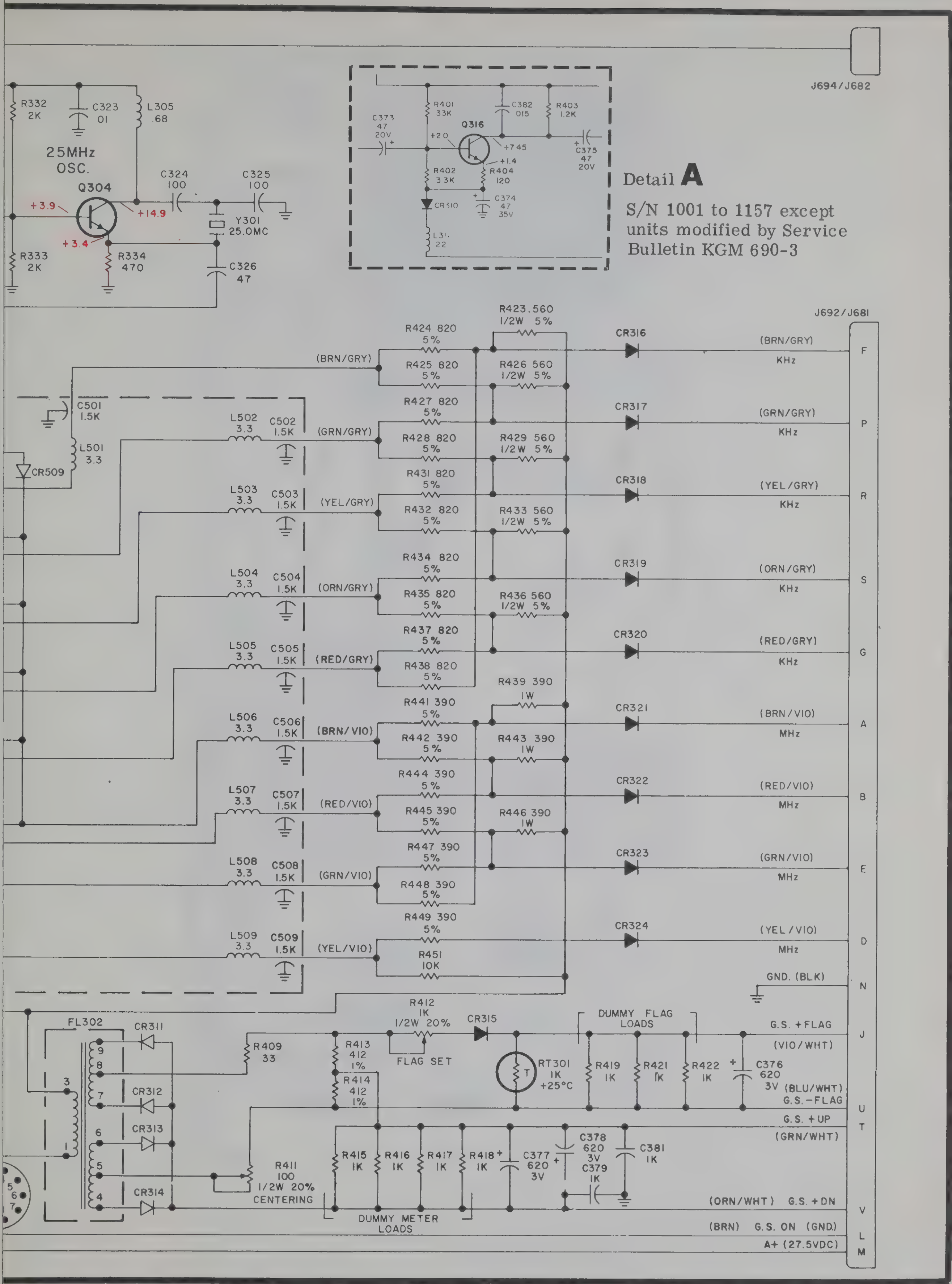


Figure 7-2. Glideslope Receiver Schematic Diagram

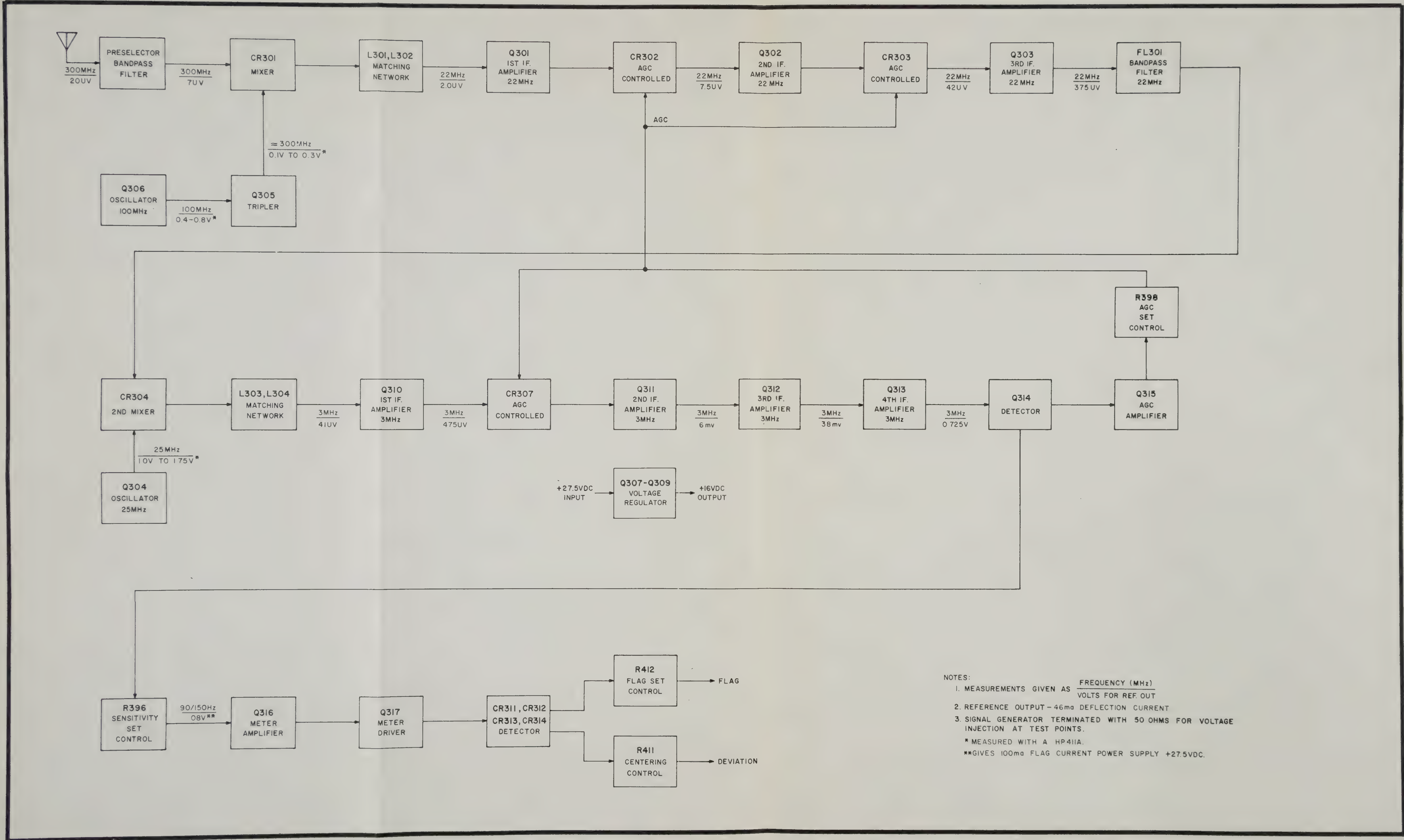


Figure 7-1. Glideslope Receiver Block Diagram

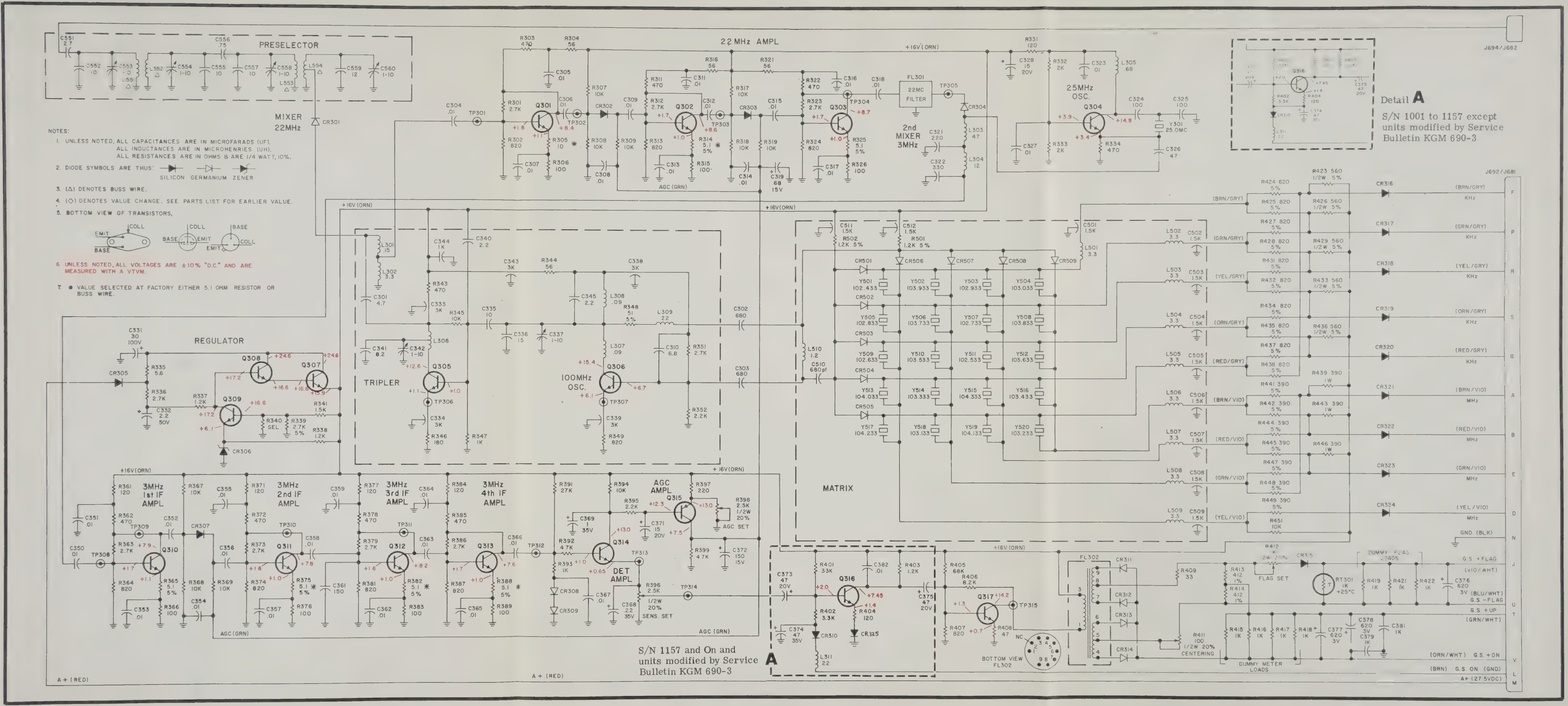


Figure 7-2. Glideslope Receiver Schematic Diagram

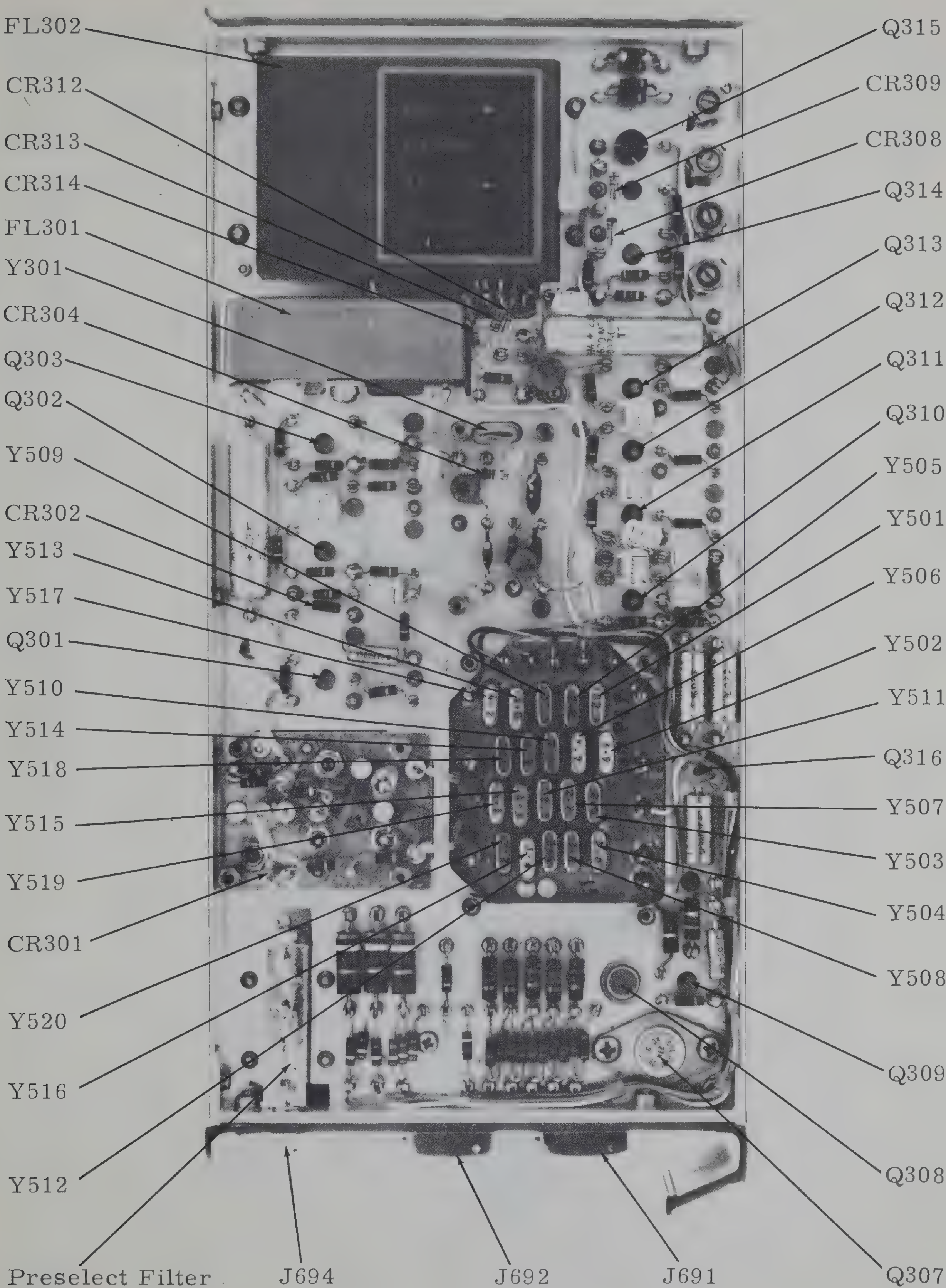


Figure 7-3. Glideslope Receiver Component Locations (Sheet 2)

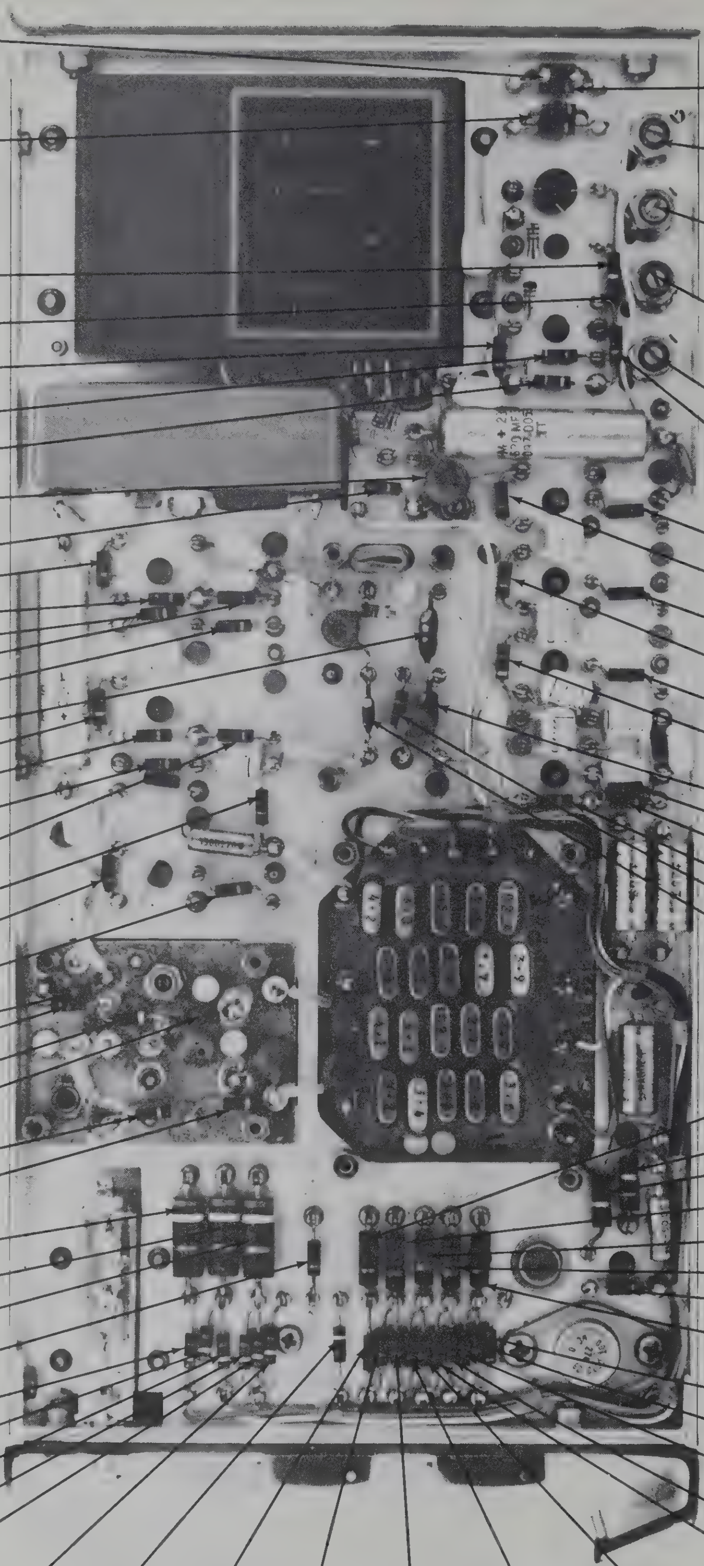


Figure 7-3. Glideslope Receiver Component Locations (Sheet 3)

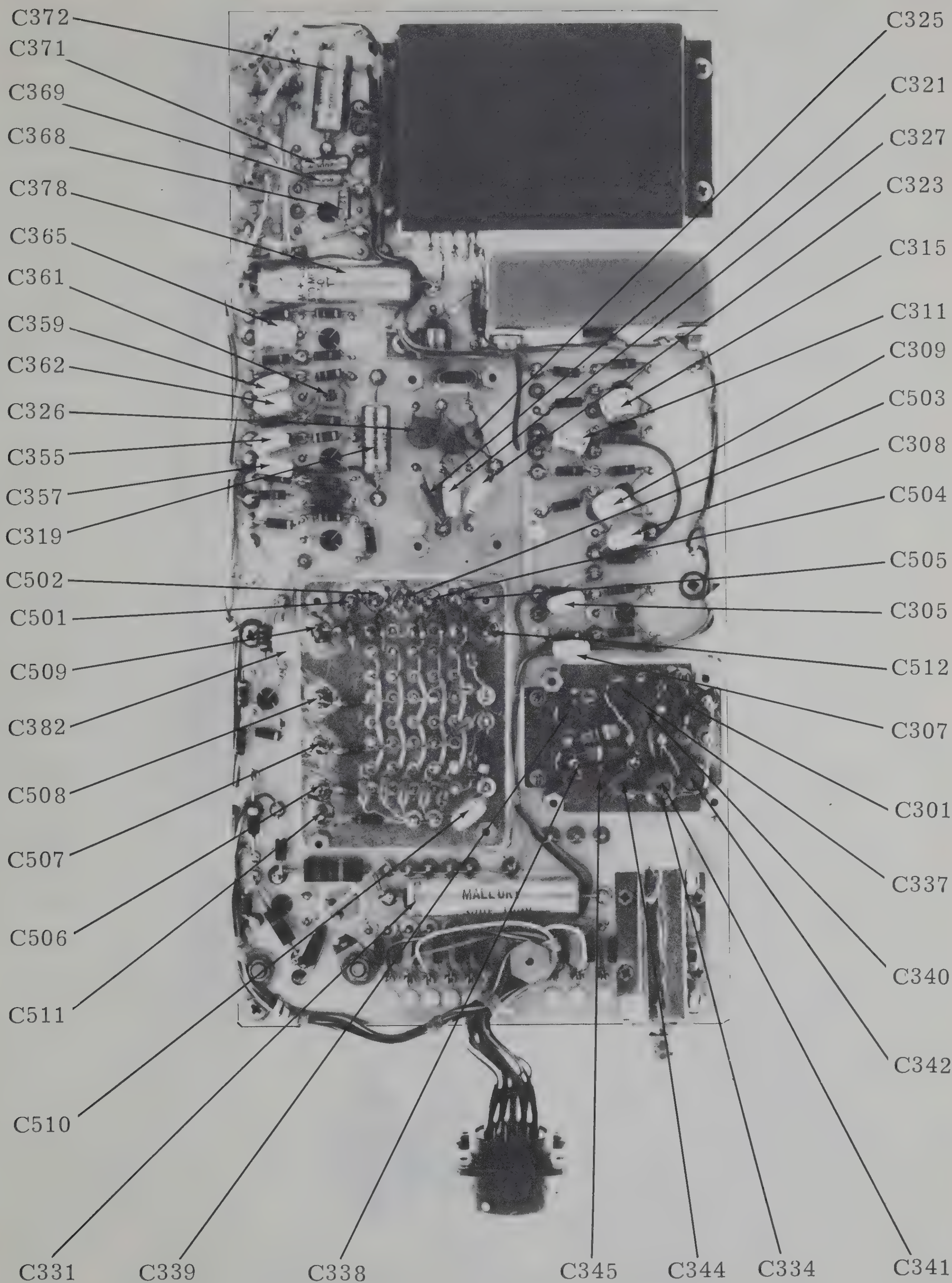


Figure 7-3. Glideslope Receiver Component Locations (Sheet 4)

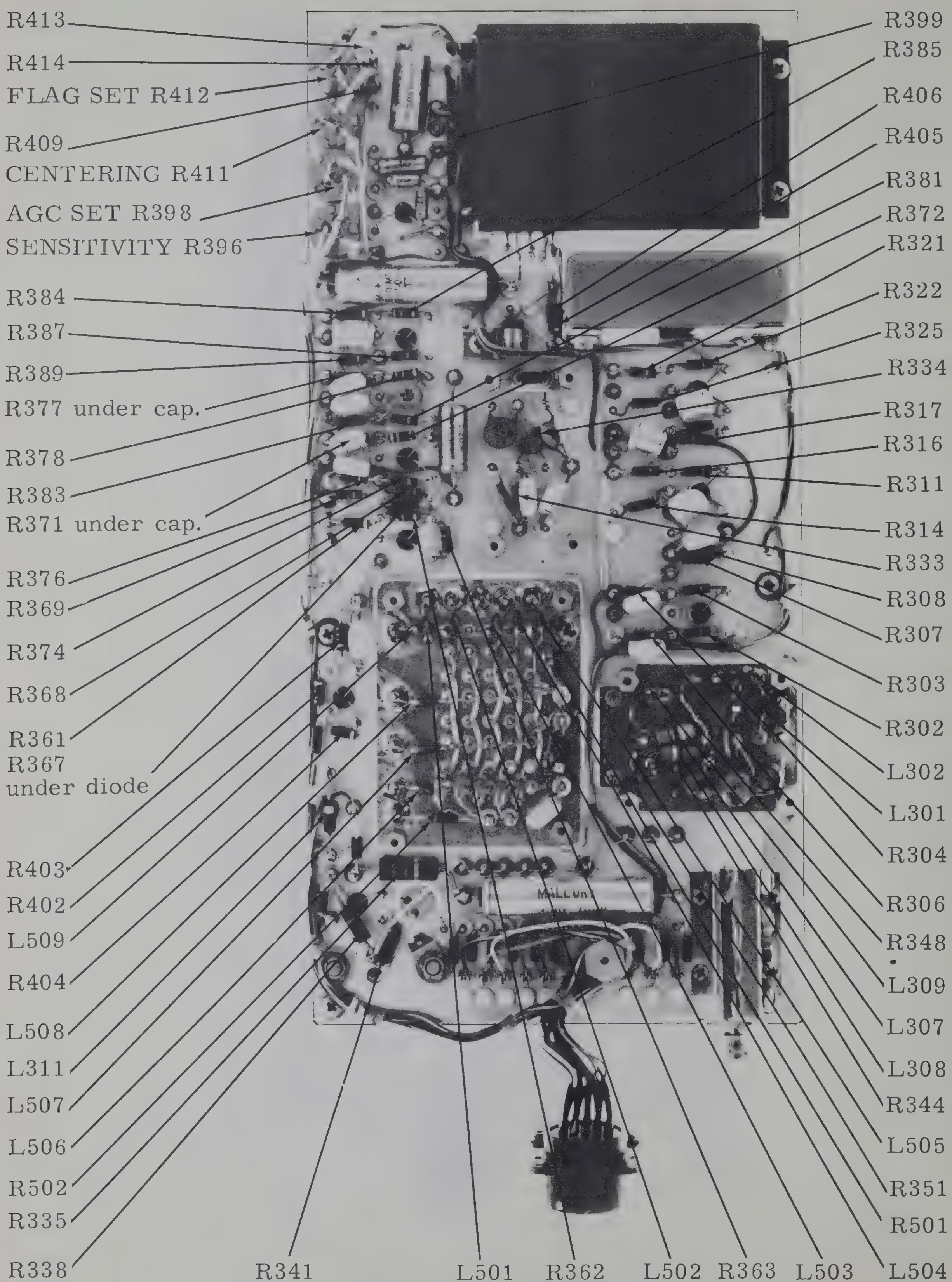
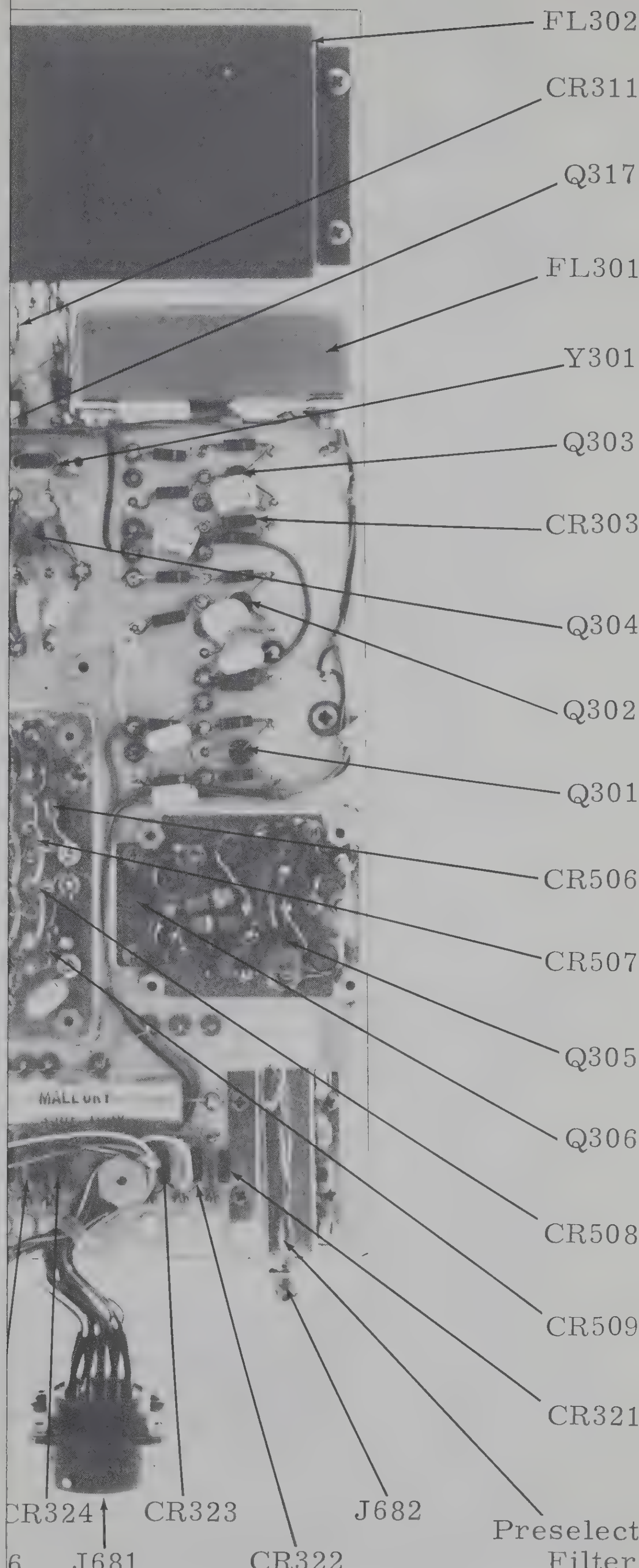


Figure 7-3. Glideslope Receiver Component Locations (Sheet 5)



eceiver Component Locations (Sheet 6)

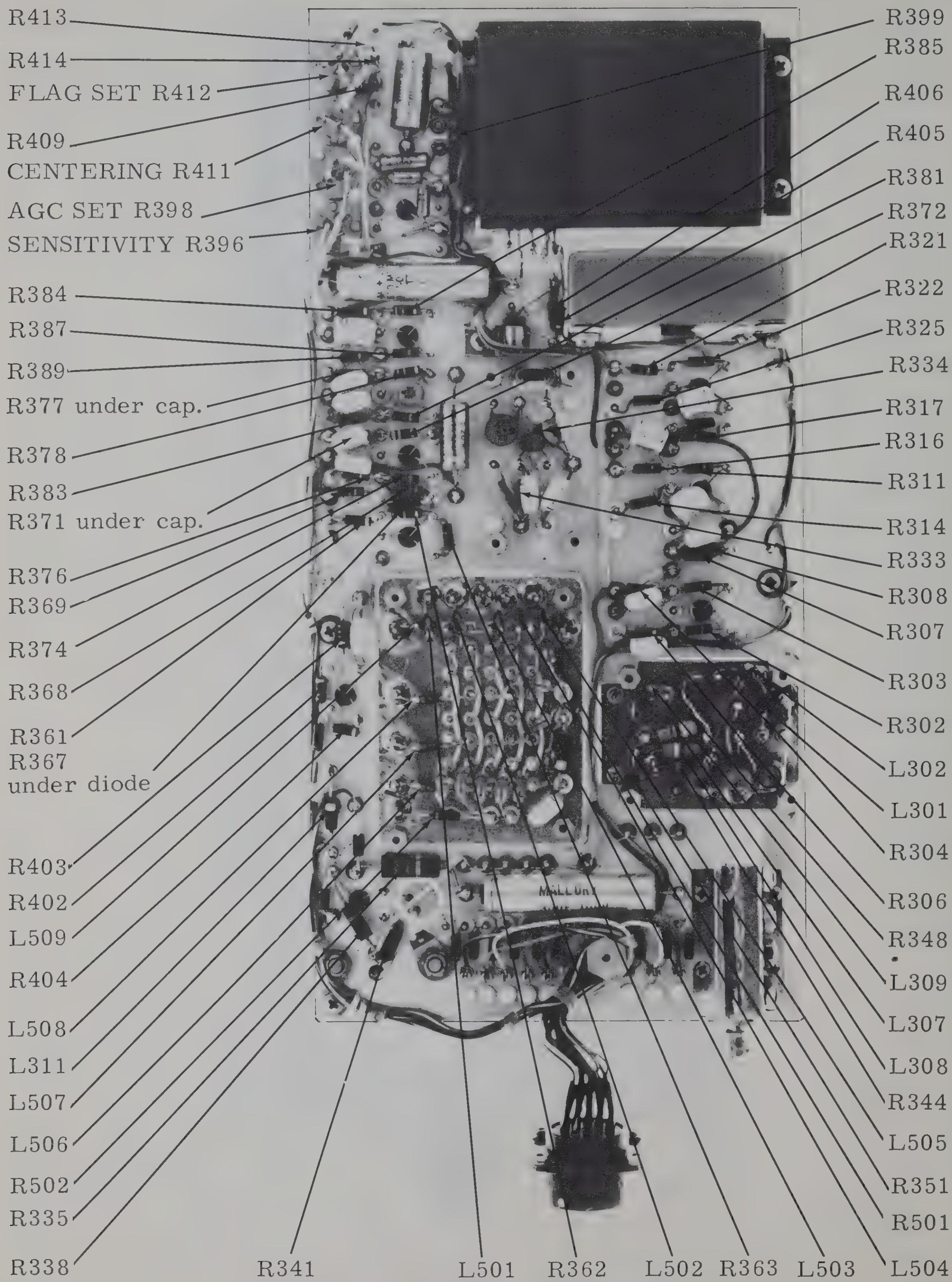


Figure 7-3. Glideslope Receiver Component Locations (Sheet 5)

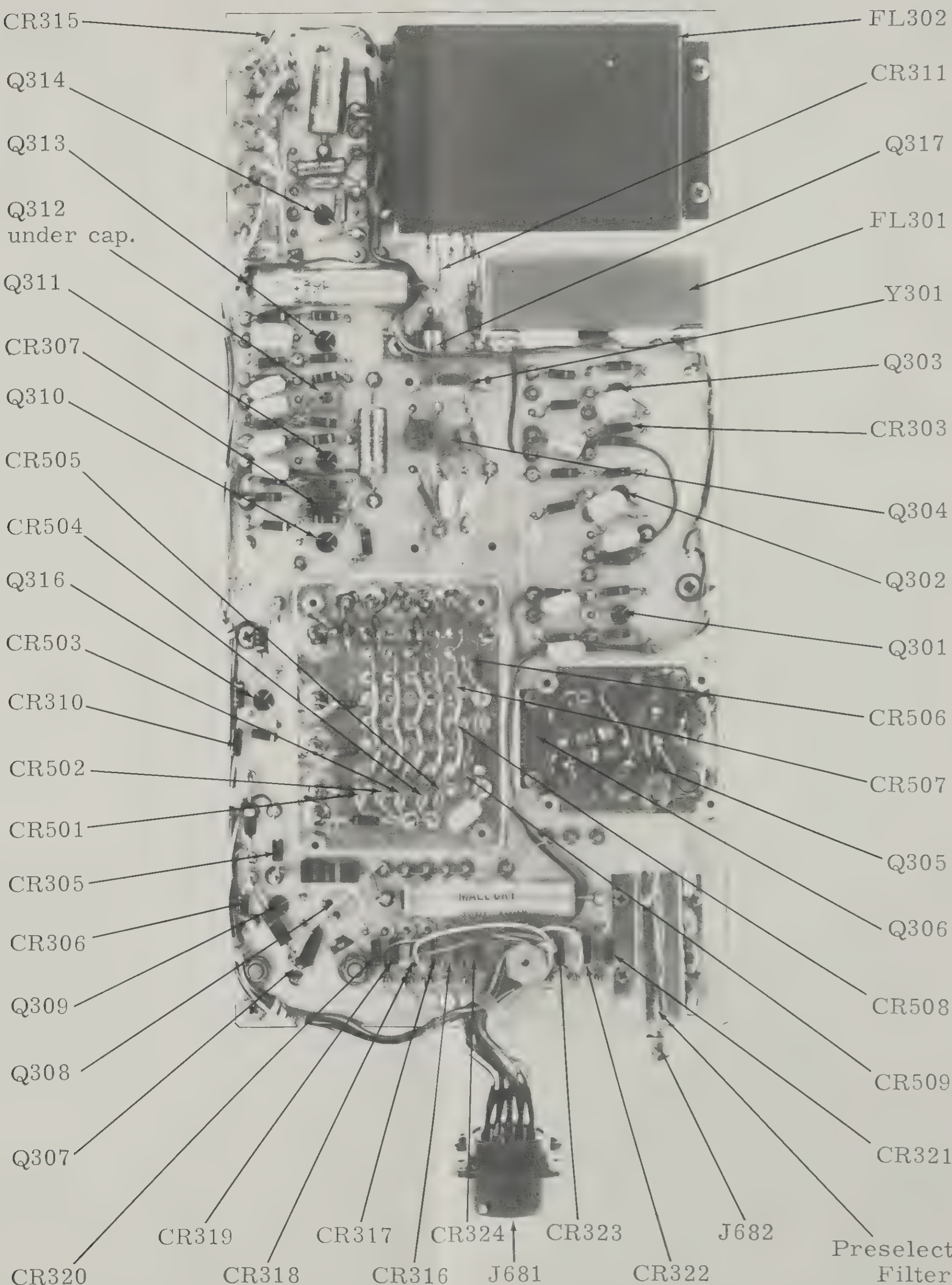
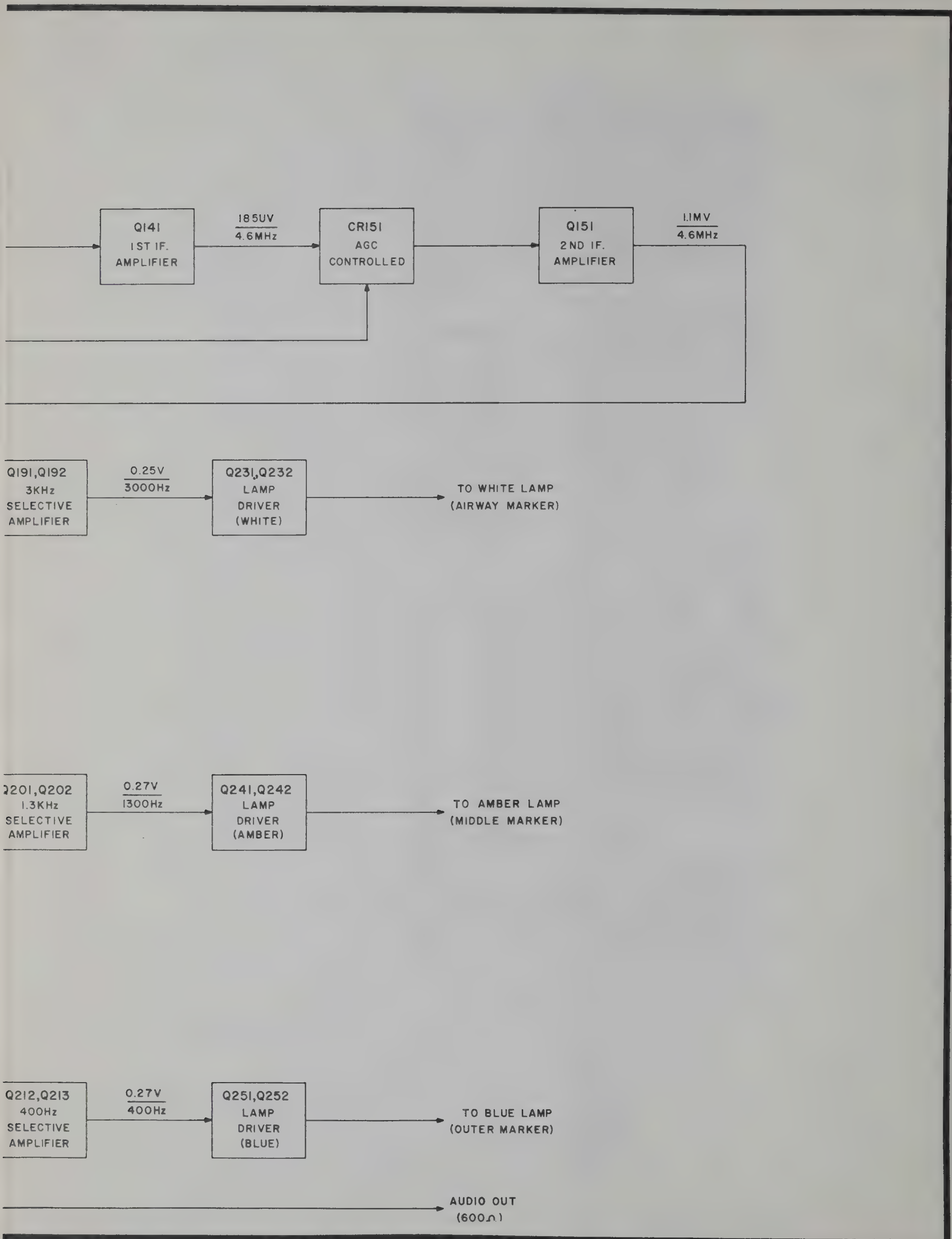


Figure 7-3. Glideslope Receiver Component Locations (Sheet 6)


Q141
1ST IF.
AMPLIFIER
185UV
4.6MHz
CR151
AGC
CONTROLLED
Q151
2ND IF.
AMPLIFIER
1.1MV
4.6MHz
Q191,Q192
3KHz
SELECTIVE
AMPLIFIER
0.25V
3000Hz
Q231,Q232
LAMP
DRIVER
(WHITE)
TO WHITE LAMP
(AIRWAY MARKER)
Q201,Q202
1.3KHz
SELECTIVE
AMPLIFIER
0.27V
1300Hz
Q241,Q242
LAMP
DRIVER
(AMBER)
TO AMBER LAMP
(MIDDLE MARKER)
Q212,Q213
400Hz
SELECTIVE
AMPLIFIER
0.27V
400Hz
Q251,Q252
LAMP
DRIVER
(BLUE)
TO BLUE LAMP
(OUTER MARKER)
AUDIO OUT
(600Ω)

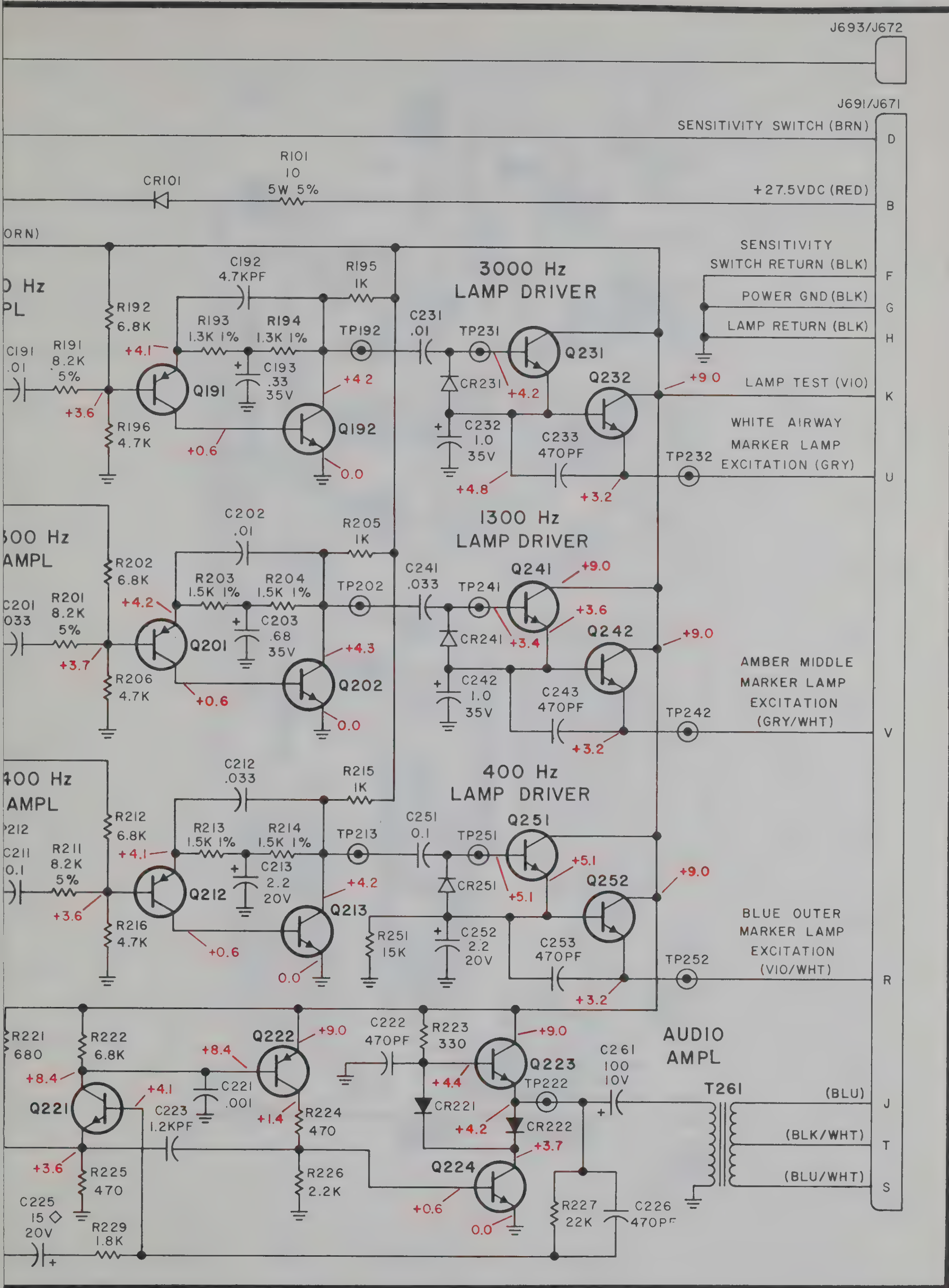


Figure 7-5. Marker Beacon Receiver Schematic Diagram

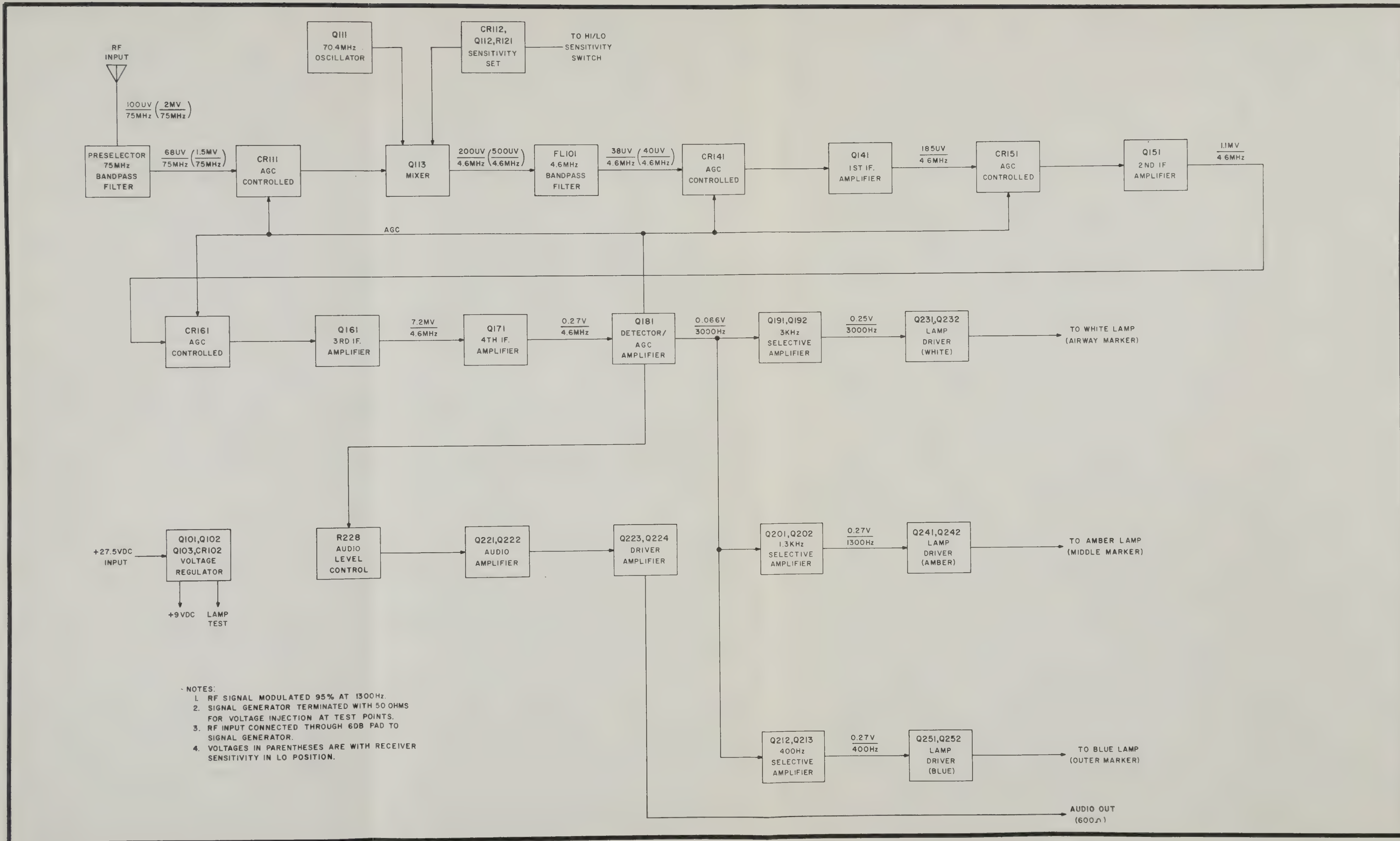


Figure 7-4. Marker Beacon Receiver Block Diagram

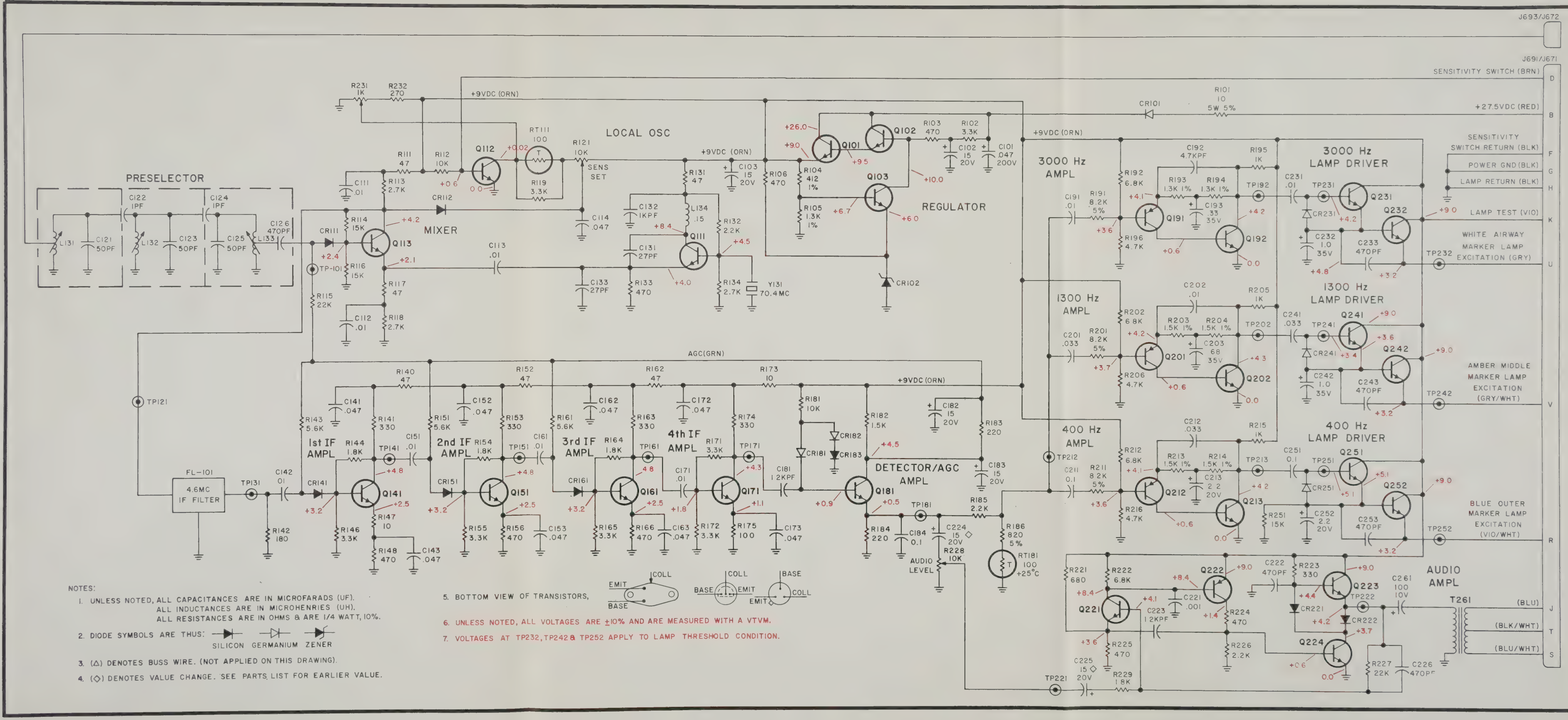


Figure 7-5. Marker Beacon Receiver Schematic Diagram

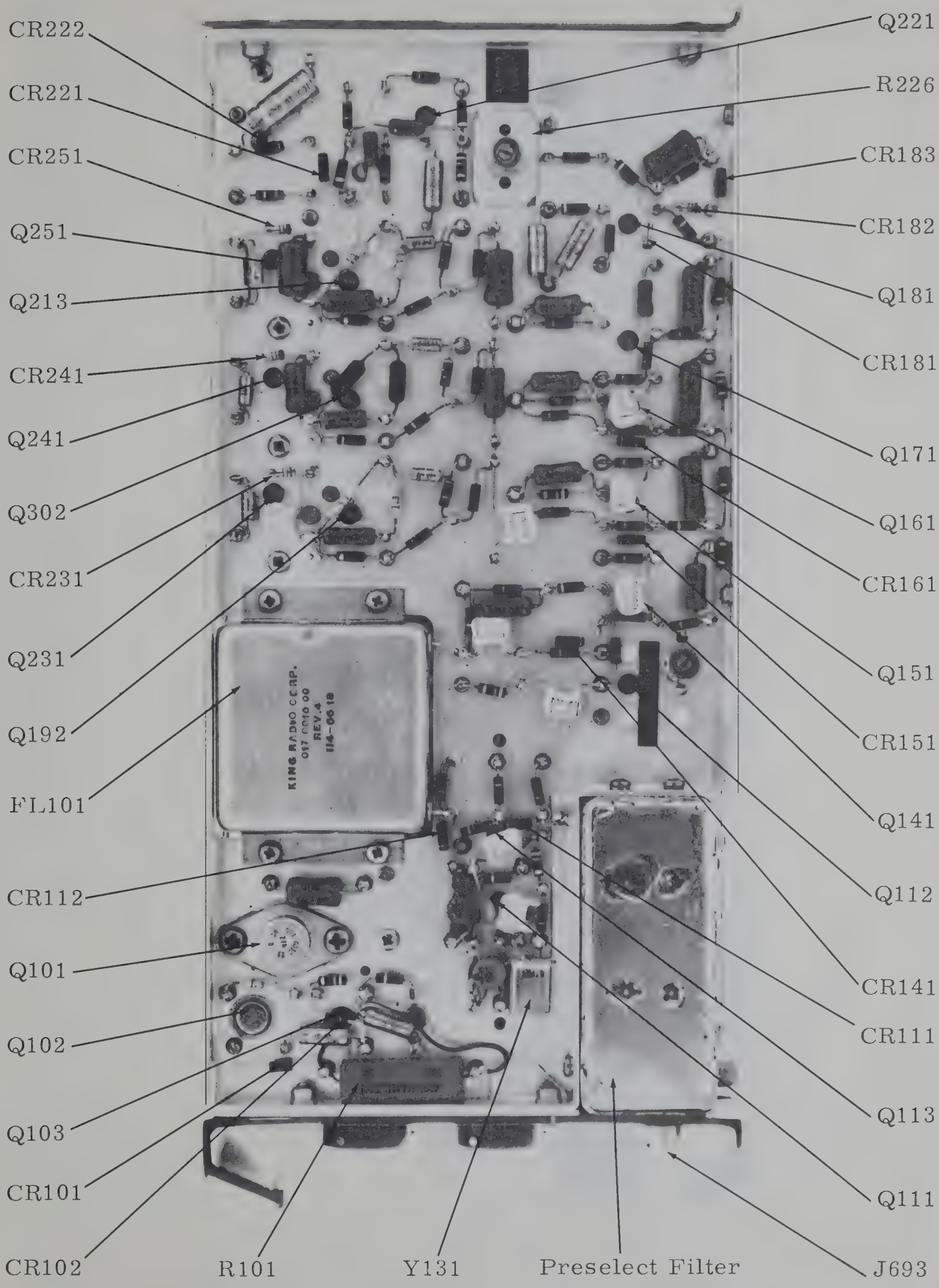


Figure 7-6. Marker Beacon Receiver Component Locations (Sheet 2)

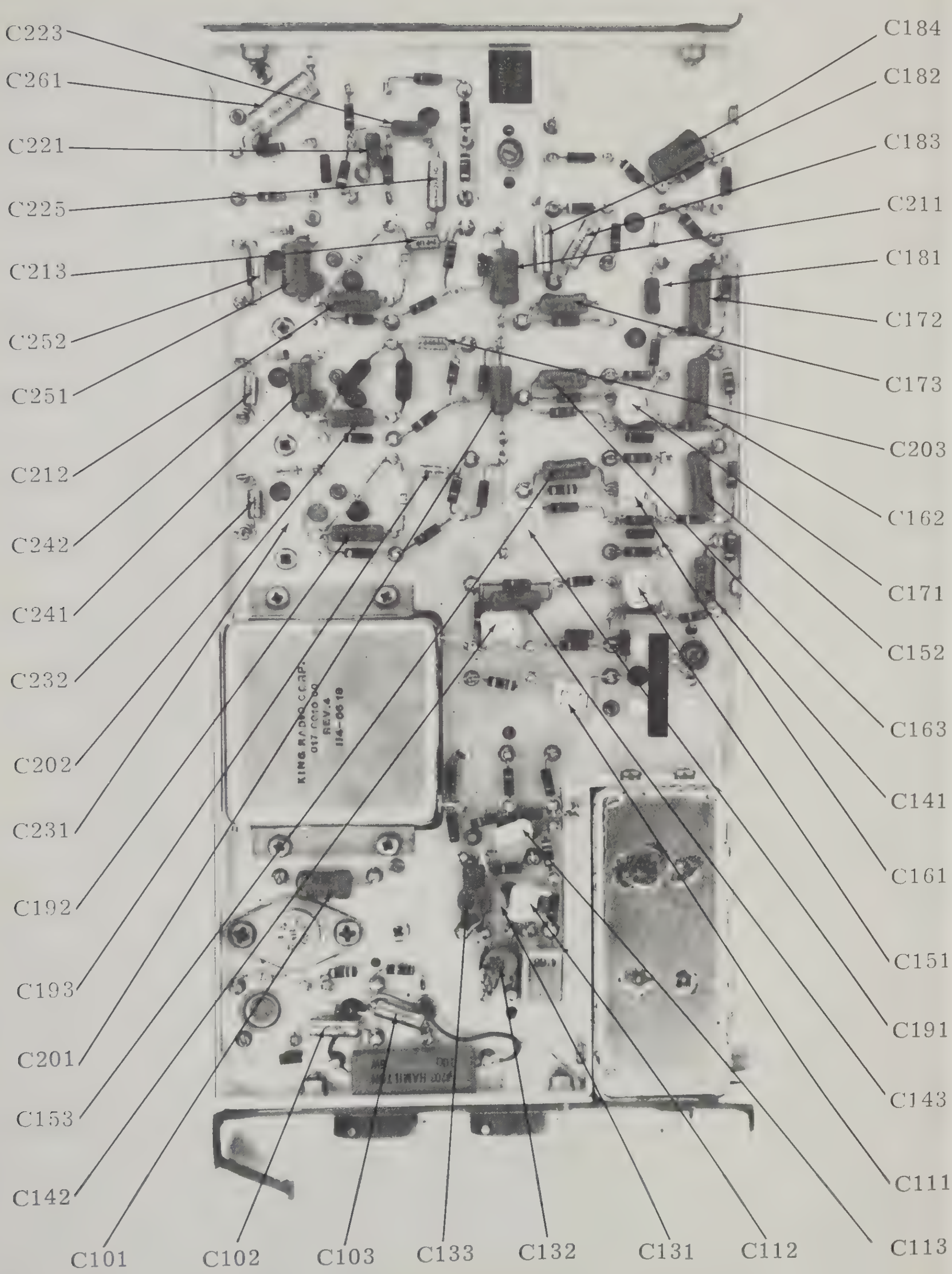


Figure 7-6. Marker Beacon Receiver Component Locations (Sheet 1 of 5)

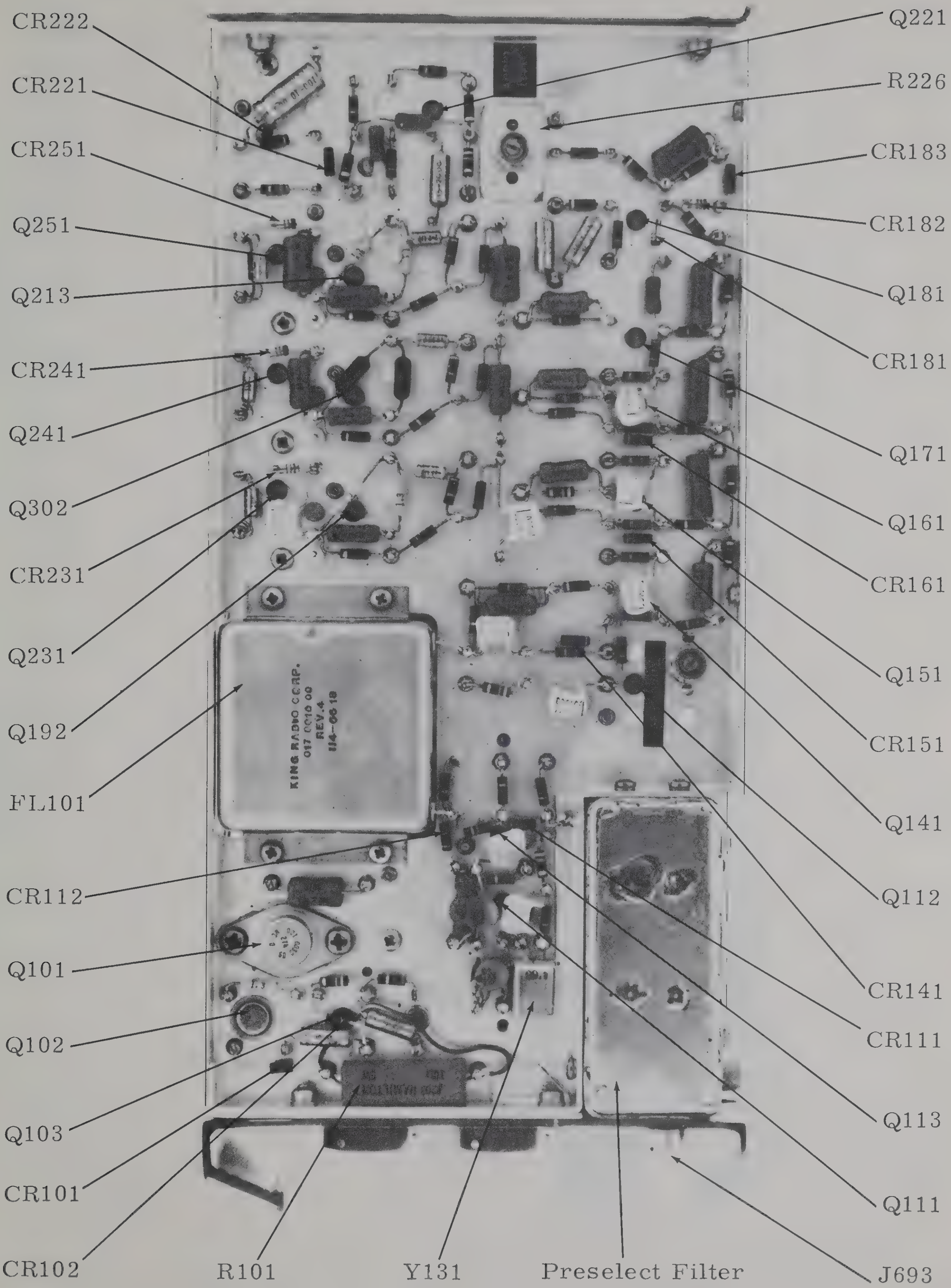


Figure 7-6. Marker Beacon Receiver Component Locations (Sheet 2)

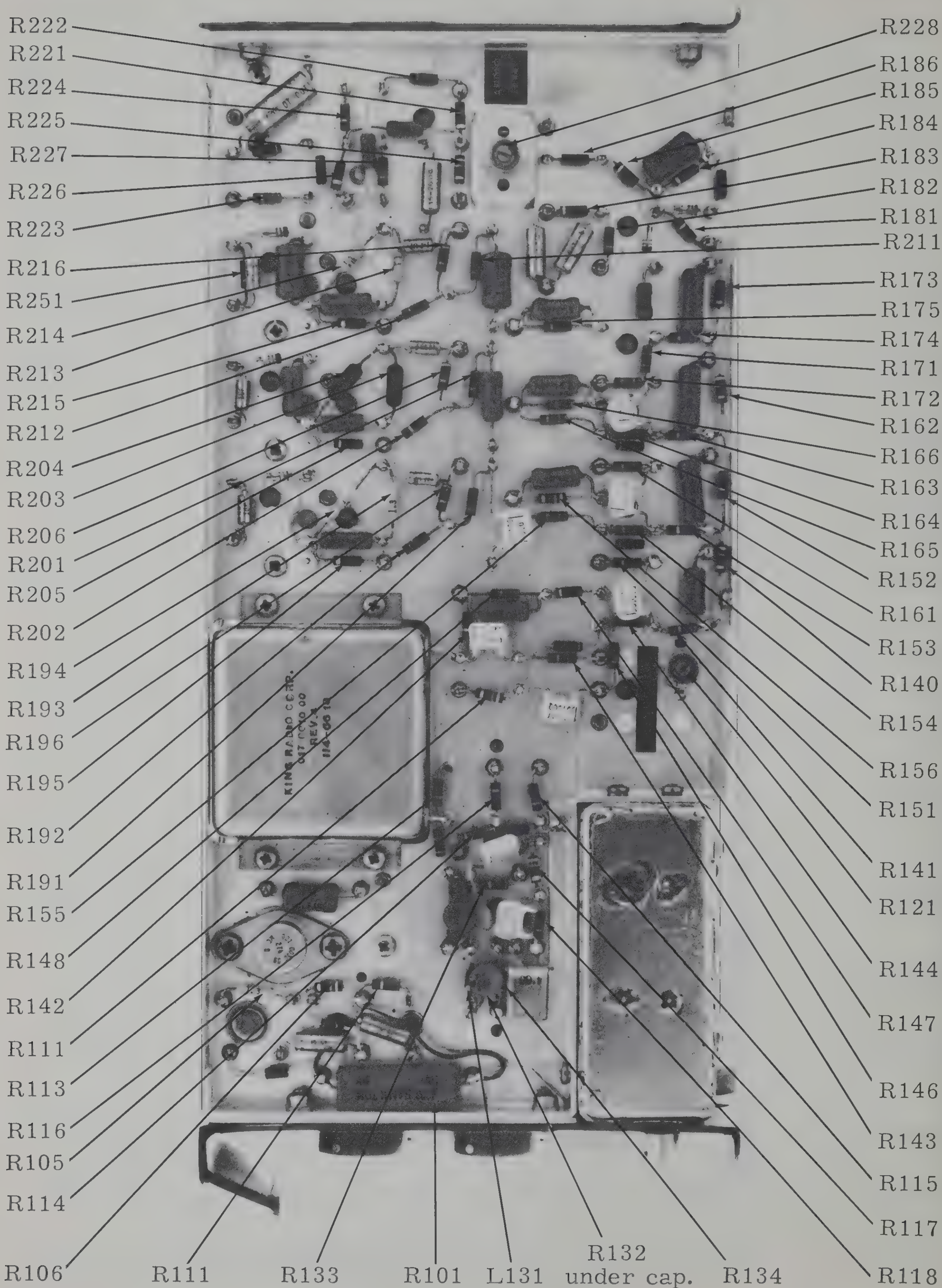


Figure 7-6. Marker Beacon Receiver Component Locations (Sheet 3)

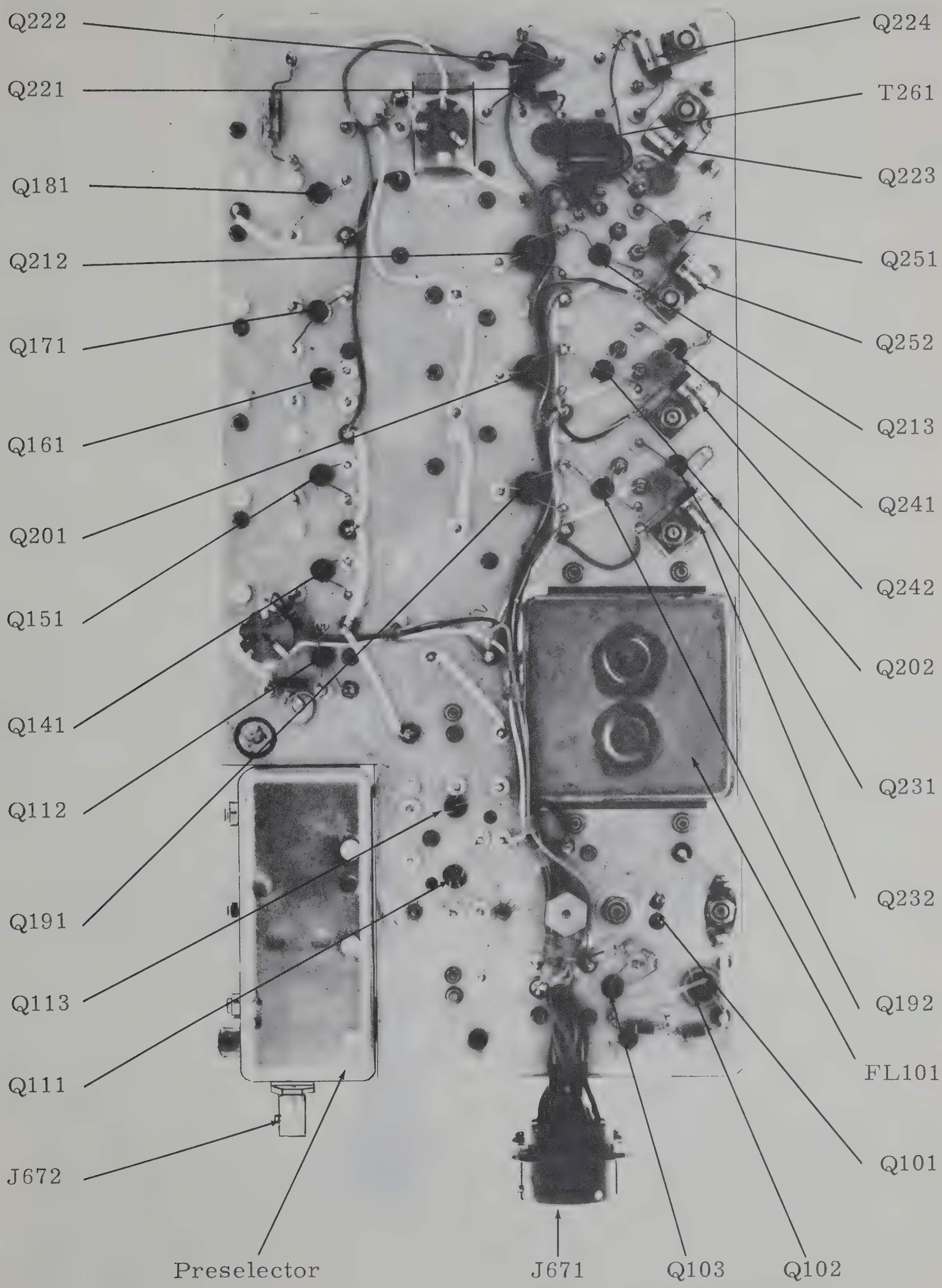


Figure 7-6. Marker Beacon Receiver Component Locations (Sheet 4)

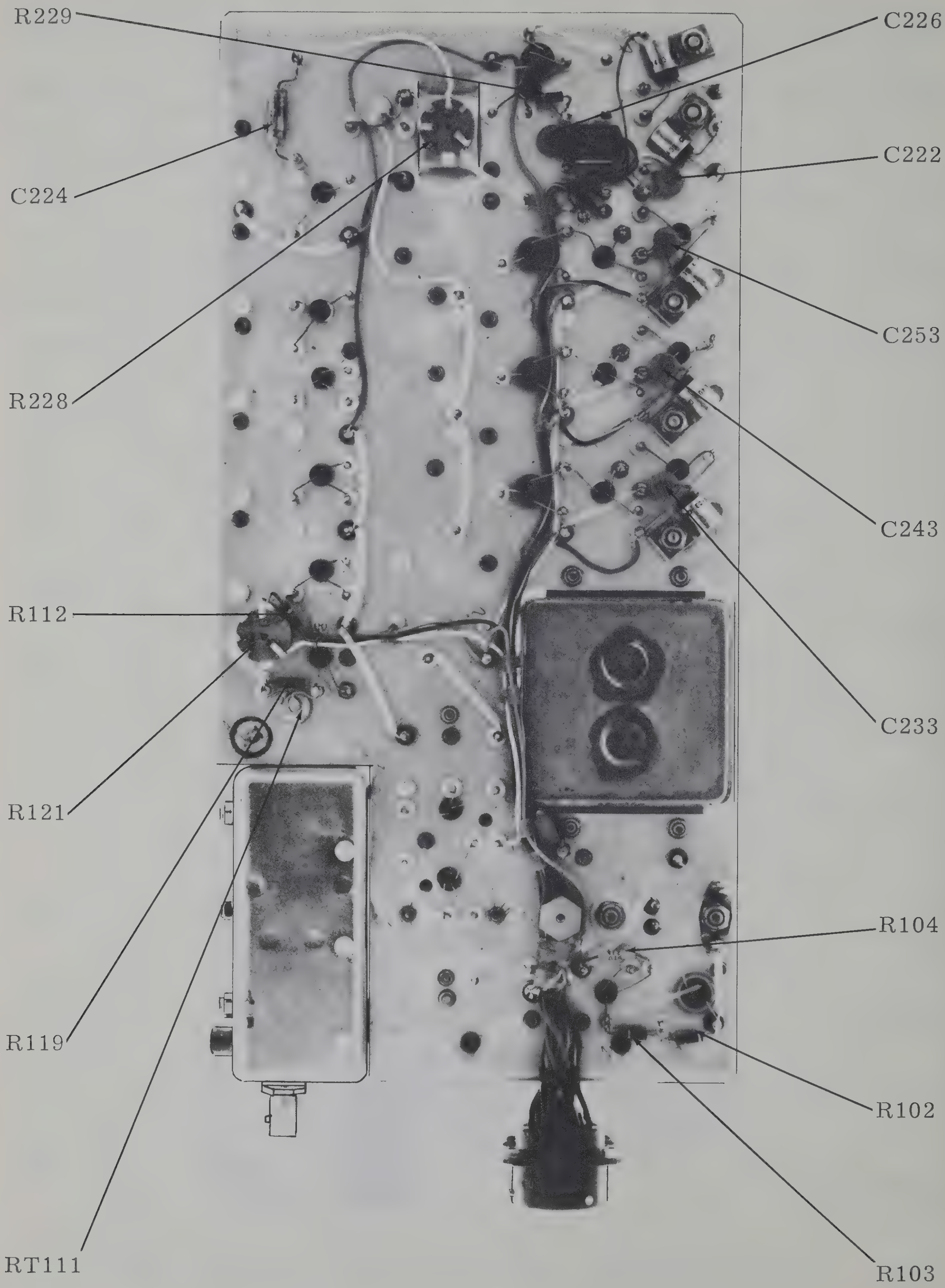


Figure 7-6. Marker Beacon Receiver Component Locations (Sheet 5)

PART II

40 CHANNEL

TABLE OF CONTENTS

SECTION I GENERAL INFORMATION

SECTION II INSTALLATION

SECTION III OPERATION

SECTION IV THEORY OF OPERATION

SECTION V ILLUSTRATED PARTS LISTS

SECTION VI MAINTENANCE

GLIDESLOPE/MARKER RECEIVER

TABLE OF CONTENTS

DIAGRAMS AND ILLUSTRATIONS

TABLES

GLIDESLOPE/MARKER RECEIVER

SECTION I

GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains information relative to the physical, mechanical and electrical characteristics of the Cessna 800 Glideslope/Marker Beacon Receiver. Refer to Part I of this manual for description, operation and parts list for the Marker Beacon Receiver.

1.2 PURPOSE OF EQUIPMENT

The Cessna 800 Glideslope/Marker Beacon Receiver is a TSO'd marker beacon receiver and 40 channel glideslope receiver designed to be used in conjunction with the NAV Receiver and external ARINC deviation indicator(s). When an ILS channel is selected by the NAV Receiver, the receiver provides glideslope steering information and marker information to the pilot.

The Cessna 800 Glideslope/Marker Beacon Receiver consists of a Glideslope Receiver and a 670 Marker Beacon Receiver enclosed in a remote mounted package. Connections are made through a 26 pin MS type connector for the glideslope receiver and a 19 pin MS type connector for the marker receiver. Both connectors are located on the front panel of the unit. The unit may be mounted in any position and requires no shock mounting.

The unit is solid state and contains circuitry necessary to receive glideslope signals and convert them into DC voltages to drive external ARINC type indicators, plus the circuitry necessary to receive marker signals and convert them into control for marker lamps. The glideslope receiver is capable of driving five 1, 000 ohm deviation loads and four 1, 000 ohm alarm flag loads.

1.3 TECHNICAL CHARACTERISTICS

Minimum Performance Requirements under standard conditions. (Ambient Room Temperature and Humidity).

Table 1-1. Cessna 800 Glideslope Technical Characteristics

SPECIFICATIONS	CHARACTERISTICS
PHYSICAL DIMENSIONS (Unit Only)	WIDTH: 2.25 inches (5.7cm) HEIGHT: 5.0 inches (12.7cm) DEPTH: 11.25 inches (28.6cm)
TSO CATEGORIES (GLIDESLOPE RECEIVER)	C34c Operation Performance Category II Class D Env. Cat. (DO-138) AANAAAXXXXX
OVERALL MOUNTING (RACK AND CONNECTOR INCLUDED)	WIDTH: 2.50 inches (6.35cm) HEIGHT: 5.25 inches (13.3cm) DEPTH: 11.75 inches (30cm)

SPECIFICATIONS	CHARACTERISTICS
MOUNTING:	Rigid, any position
WEIGHT:	3.1 lbs (1.4 kg) (Unit Only) 3.5 lbs (1.58 kg) (Mounting Rack and Connector Included)
POWER REQUIREMENTS:	27.5VDC: 350ma Max. (Not including Marker Lamps)
CENTERING ACCURACY:	Centering accuracy of less than ±10μa under all service conditions. (Operation Performance Category II, Class D)
DEFLECTION CHARACTERISTICS:	A difference in depth of modulation of 0.091ddm or 2db, shall produce a deflection of 78μa. The deviation under opposite polarity shall be 78 ±3μa.
SELECTIVITY:	Less than a 6db variation in sensitivity when the frequency is varied ±21KHz. At least 60db down from 329.00MHz to 335.15MHz excluding the range from ±129KHz of center frequency.
NUMBER OF CHANNELS:	40, 150KHz Spacing
FREQUENCY RANGE:	329.15MHz to 335.00MHz
INPUT IMPEDANCE	50 ohms
SENSITIVITY:	40μv (Hard) for 60% of Standard Deflection
SPURIOUS RESPONSE:	All responses in the range from 90KHz to 1,500 MHz at least 60db below center frequency response, excluding the range from 329.00MHz to 335.15MHz.
TEMPERATURE:	-54°C to +55°C Operating (Short Time +71°C)
DUTY CYCLE:	Continuous
LOADS:	Capable of operating five 1,000 ohm deviation loads and four 1,000 ohm alarm flag loads.

GLIDESLOPE/MARKER RECEIVER

SECTION II

INSTALLATION

2.1 GENERAL

Installations of the Cessna 800 Glideslope Receiver will differ according to the number and types of indicators installed, equipment location and other factors. Cable harnesses will be fabricated by the installing agency to fit these various requirements. This section contains interconnect diagrams, mounting dimensions and information pertaining to installation.

2.2 UNPACKING AND INSPECTING EQUIPMENT

Exercise extreme care when unpacking the equipment. Make a visual inspection of the unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim. The claim should be promptly filed with the transportation company. When equipment has been removed, place in the shipping container all packing, bracing, and filler used in the original packing. Save the packing material for use in unit storage or reshipment.

2.3 INSTALLATION PROCEDURES

The Cessna 800 Glideslope Receiver should be installed in accordance with standards established by the customer, installing agency, and existing conditions as to unit location and type of installation. However, the following suggestions should be considered before installing the Receiver. Close adherence to these suggestions will assure a more satisfactory performance from the equipment.

a. Select the Receiver location. The Receiver may be mounted rigid. Allow one inch of free air space around top and rear of unit. Allow one-half inch on each side.

b. Refer to outline and dimension drawing, Figure 2-1 for the mounting dimensions.

NOTE

Allot adequate space for installation of cables and connections.

c. Mark, punch, and drill the mounting holes. Care must be taken to avoid damage to adjacent equipment or cables.

d. Using four #6-32 screws and the holes drilled in step c secure the mounting rack firmly in place.

e. Slide the Receiver into the rack. Using the hold down clamp on the front of the equipment rack, secure the Receiver to the mounting rack.

f. The installing agency will supply and fabricate all external cables. The plugs required are supplied by Cessna Dealers' Organization.

g. The length and routing of the external cables must be carefully studied and planned before attempting actual installation. Avoid sharp bends and placing the cable near the aircraft control cables.

h. Fabricate the external cables in accordance with Figures 2-4, 2-5.

NOTE

It is recommended that a continuity check be made on the cable to eliminate possible troubles thus avoiding equipment damage.

i. Use a suitable glideslope antenna and insure that its mounting location is in a clear, unobstructed line to the glideslope ground station while on the glidepath.

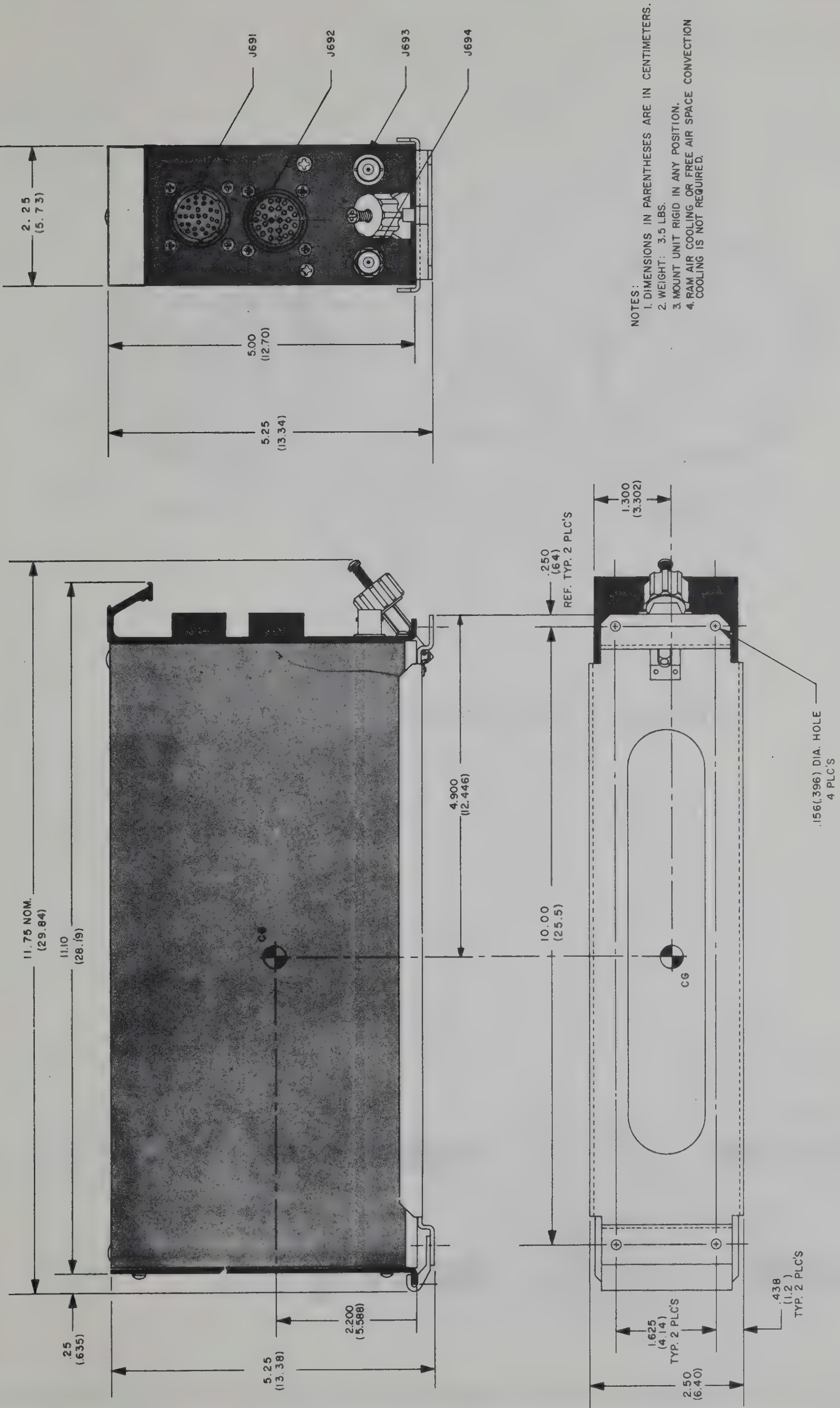


FIGURE 2-1 OUTLINE AND MOUNTING DRAWING

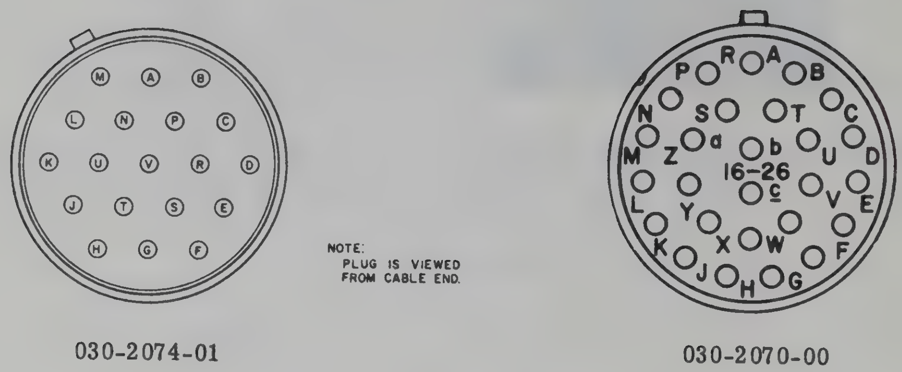


FIGURE 2-2 CONNECTOR PIN LOCATION

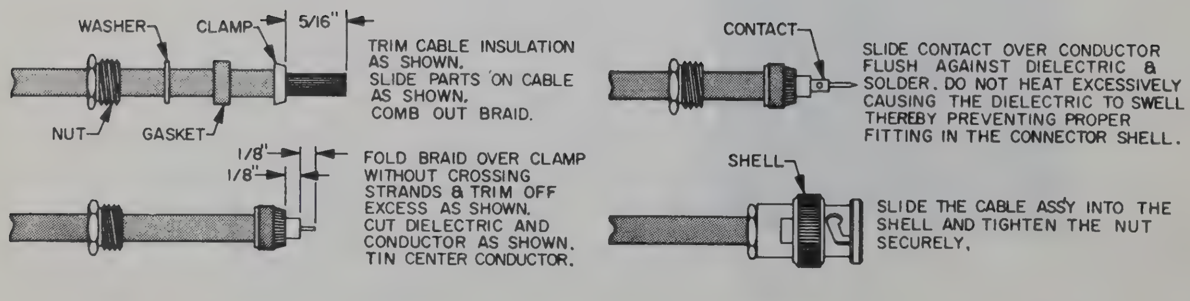


FIGURE 2-3 ANTENNA CONNECTOR ASSEMBLY

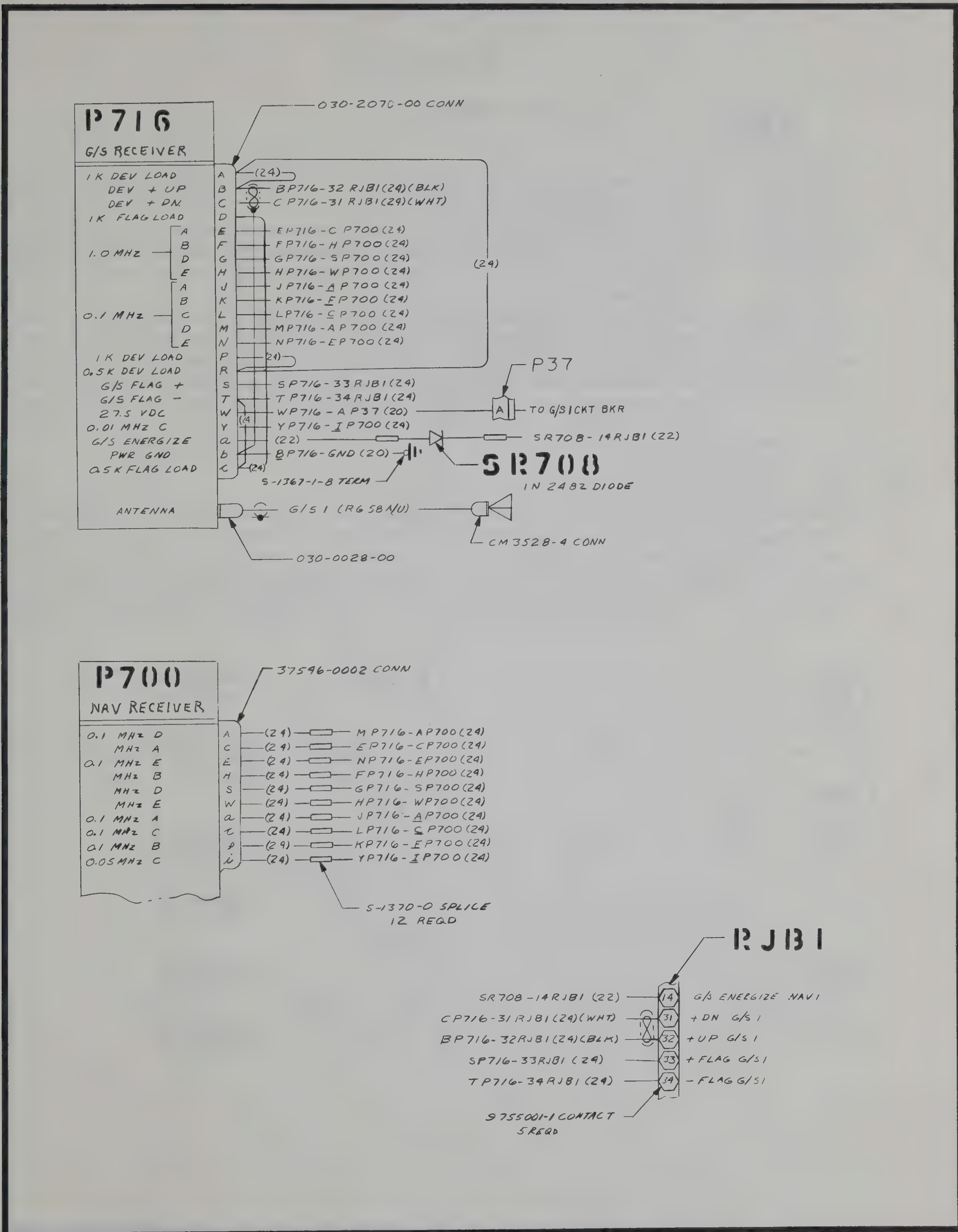


FIGURE 2-4 GLIDESLOPE INTERCONNECT DIAGRAM

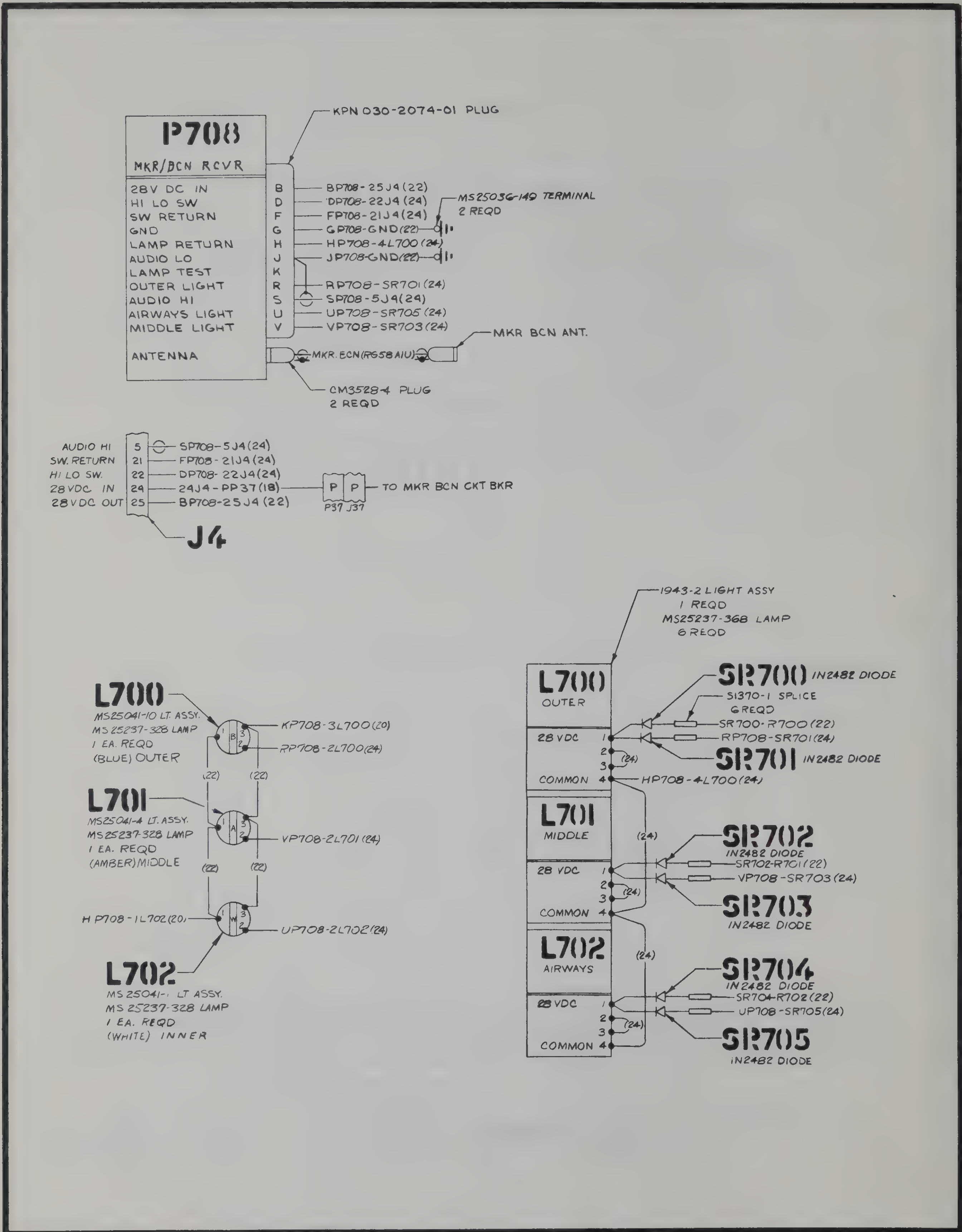


FIGURE 2-5 MARKER BEACON INTERCONNECT DIAGRAM

GLIDESLOPE /MARKER RECEIVER

SECTION III

OPERATION

3.1 Glideslope Receiver

The Glideslope Receiver is energized by its associated VOR/LOC Receiver. The glideslope frequencies are paired with localizer frequencies such that both signals are received simultaneously when the localizer frequency is selected.

When the glideslope warning flag is fully concealed, the descent steering information presented on the horizontal meter of an indicator. A centered horizontal meter indicates that the aircraft is on a proper glidepath and usually occurs in the vicinity of the outer marker. An aircraft descent angle is then established to maintain the centered meter presentation. An up or down deflection requires a corresponding descent adjustment to remain on the glidepath.

3.2 Marker Receiver

The Marker Receiver when used with appropriate indicators, provides the pilot visual information of the aircraft passage over beacon stations located on airways or ILS approach courses. The blue lamp lights when passing over outer markers, the amber lamp lights when passing over middle markers and the white lamp (or fan marker) lights when passing over airways markers. White is also used to indicate runway threshold during CAT II instrument approaches.

GLIDESLOPE/MARKER RECEIVER

SECTION IV
THEORY OF OPERATION

4.1 GENERAL

The Cessna 800 Glideslope/Marker Receiver Theory of Operation is presented in block diagram and detail circuit theory sections. Description of the Marker Beacon can be found in Part I of this manual.

A discussion of the principles of the glideslope system precedes the circuit theory.

4.2 PRINCIPLES OF THE GLIDESLOPE SYSTEM

The glideslope signal is radiated by a directional antenna array located near the approach end of the runway. The signal consists of two intersection lobes of RF energy. The upper lobe contains 90Hz modulation and the lower lobe contains 150Hz modulation. The equal tone amplitude intersection of these two lobes forms the glide path. A typical glide angle is 2.5 degrees. If the aircraft is on the glide path, equal amplitudes of both tones will be received and the deviation bar will be centered. If the aircraft is above the glide path, 90Hz modulation predominates and the visual display is displaced downward. If below the glide path, 150Hz predominates and the display is displayed upward.

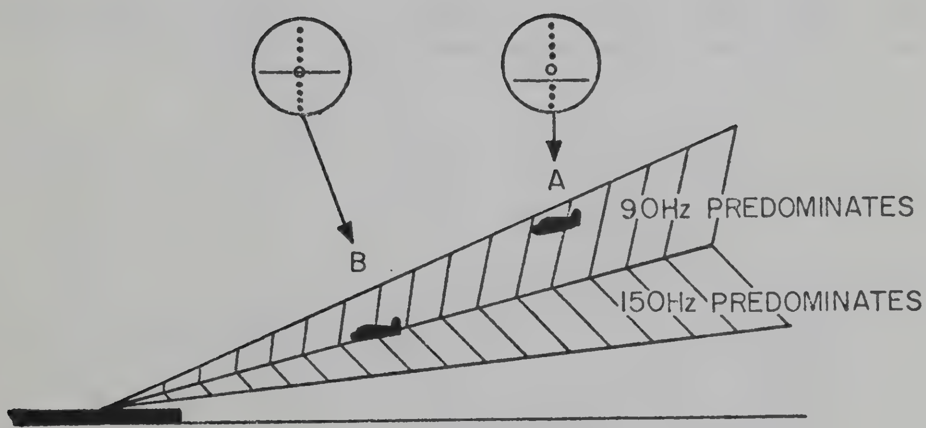


FIGURE 4-1 GLIDEPATH

4.3 BLOCK DIAGRAM CIRCUIT THEORY

4.3.1 GLIDESLOPE RECEIVER (Figure 4-2)

The glideslope signals in the range of 329.15MHz to 335.00MHz are coupled from the antenna

through a 3 pole preselector to the first mixer. In the first mixer the incoming signal is mixed with the tripled output of the first oscillator to yield one of four discrete first intermediate frequencies in the range from 73.775MHz to 74.225MHz. This signal is then coupled to the second mixer where it is combined with the output of the second oscillator to produce the second intermediate frequency of 21.400MHz.

The first and second oscillators have, respectively, 10 crystals and 4 crystals. The proper 2 crystals for a given channel are switched into the oscillator circuits by RF switching diodes. These diodes are controlled by an integrated circuit logic section which decodes the frequency selector information at the input of this receiver.

The 21.400MHz second mixer output is coupled through a crystal filter to provide adjacent channel selectivity and then to the I. F. amplifiers.

Two integrated circuit I. F. amplifiers provide the required gain to drive the detector and are also gain-controlled by the AGC voltage.

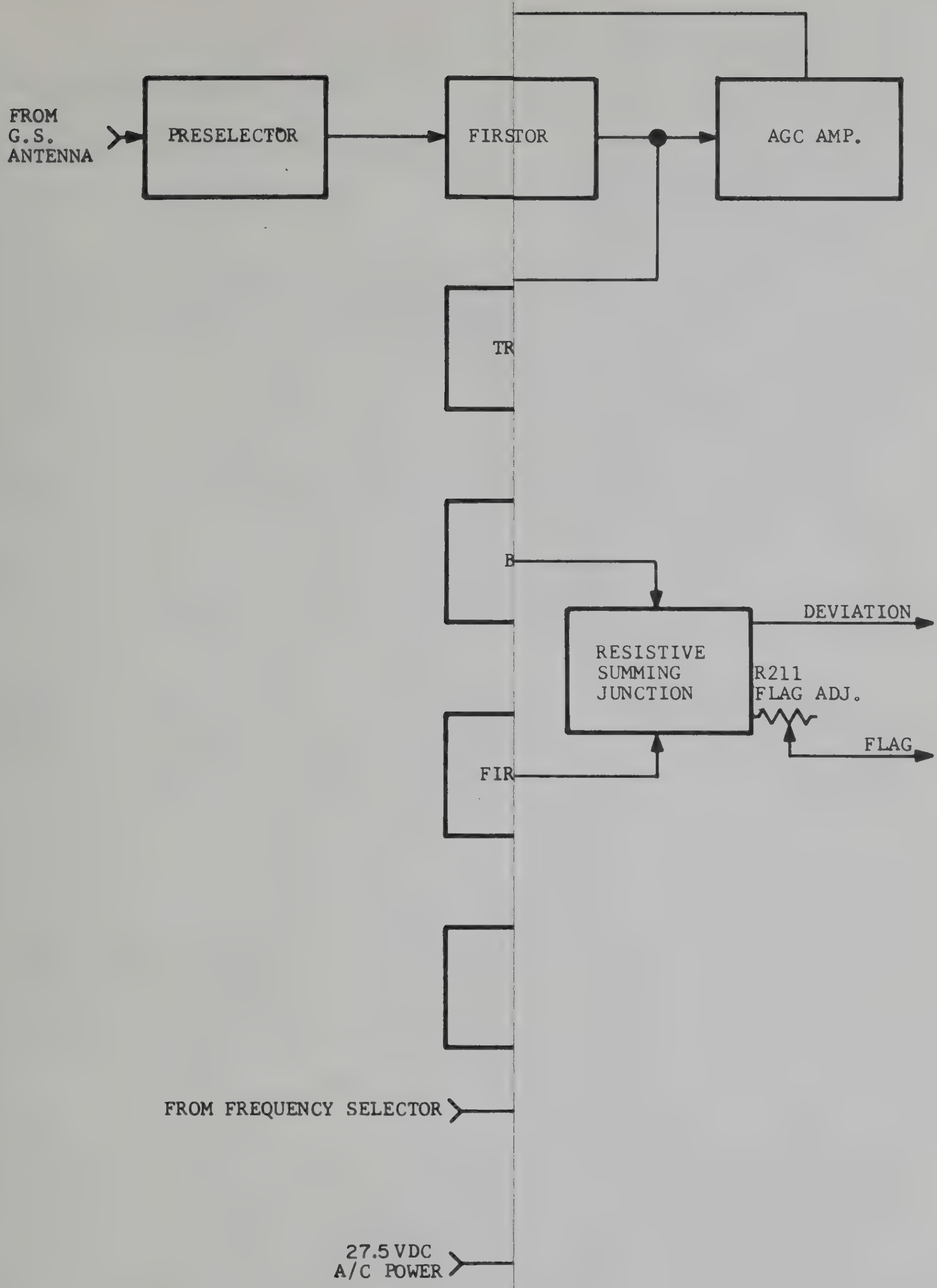
A transistor active detector recovers the composite modulation signal and generates a DC voltage proportional to its input level for the AGC amplifier. This DC level is compared with a fixed reference voltage in the AGC circuitry to set the level at which the AGC takes effect.

4.3.2 DEVIATION CONVERTER

Composite video from the detector is coupled through the course width adjustment, R194, to two active filters tuned at 90Hz and 150Hz respectively. The outputs of these filters, which are proportional to the amplitudes of the two tones in the composite signal are peak detected, filtered and fed through buffer amplifiers to prevent loading of the detectors. These two outputs are combined in resistive summing junctions to drive the deviation and warning flag indicators.

4.3.3 POWER SUPPLY

Input power to the radio, +27.5 volts DC, is regulated down to +16.0 volts DC in a conventional series regulator. R222 allows precise adjustment of the regulated voltage.



:SLOPE RECEIVER BLOCK DIAGRAM

through a 3 pole preselector to the first mixer. In the first mixer the incoming signal is mixed with the tripled output of the first oscillator to yield one of four discrete first intermediate frequencies in the range from 73.775MHz to 74.225MHz. This signal is then coupled to the second mixer where it is combined with the output of the second oscillator to produce the second intermediate frequency of 21.400MHz.

The first and second oscillators have, respectively, 10 crystals and 4 crystals. The proper 2 crystals for a given channel are switched into the oscillator circuits by RF switching diodes. These diodes are controlled by an integrated circuit logic section which decodes the frequency selector information at the input of this receiver.

The 21.400MHz second mixer output is coupled through a crystal filter to provide adjacent channel selectivity and then to the I. F. amplifiers.

Two integrated circuit I. F. amplifiers provide the required gain to drive the detector and are also gain-controlled by the AGC voltage.

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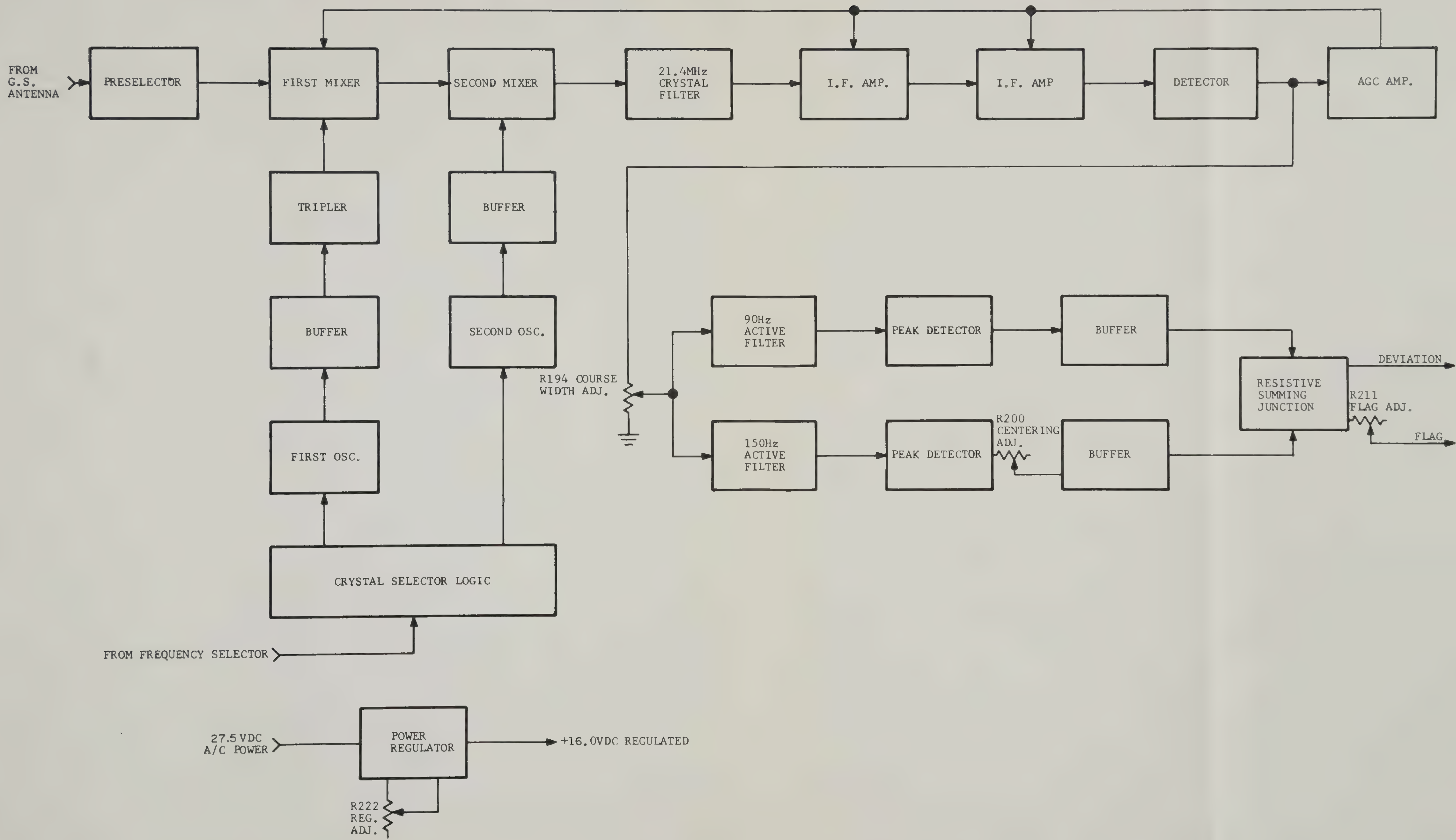


FIGURE 4-2 GLIDESLOPE RECEIVER BLOCK DIAGRAM

4.4 DETAILED CIRCUIT THEORY

4.4.1 GLIDESLOPE RECEIVER

4.4.1, a PRESELECTOR

L101, L102, and L103 are inductors in the form of paths etched directly on the printed circuit material. They have the correct inductance to resonate with C102, C105, and C107 at 332.00MHz. L117 and L118 are the reactive coupling elements between the sections of the filter. L101 and L103 are tapped at their approximate 50 ohm points for input and output matching of the preselector.

4.4.1, b FIRST MIXER

The received signal is coupled from the preselector to the base of Q101, the first mixer. Local oscillator injection is coupled to the emitter of Q101 from the first oscillator. Mixing action yields one of four discrete first intermediate frequencies, 73.775MHz, 73.925MHz, 74.075MHz, and 74.225MHz. Reference to the LOC/Glideslope Frequency Chart, Table 4-1, will allow computation of the correct frequency for each channel. T101 and T102 form a double-tuned circuit at the output of the first mixer for selectivity.

4.4.1, c SECOND MIXER AND CRYSTAL FILTER

Q102, the second mixer, receives the desired signal from a winding on T102 and second oscillator injection through C172 simultaneously at its base. The tuned circuit consisting of L104, C117 and R110 performs the dual function of providing the collector load for Q102 and impedance matching for the crystal filter, FL101, at the second intermediate frequency of 21.400MHz. FL101 provides the required adjacent channel selectivity for 150KHz channel spacing.

4.4.1, d I. F. AMPLIFIER

Integrated circuits I101 and I102 provide the majority of the overall gain of the receiver. The filter output matching network C119, L105, and R113, and the coupling transformers T103 and T104 are broadly tuned at 21.400MHz. The integrated circuits I101 and I102 amplify the weak signal at the output of the crystal filter to a level sufficient to drive the detector Q103. These two amplifiers may be gain controlled by driving current into their gain control terminals, pin 5.

4.4.1, e DETECTOR AND AGC

Q103 is used as an active detector to provide detected audio and AGC drive. The voltage divider consisting of R121, CR102, and R120 establishes a DC bias level on the base of Q103 through the secondary of T104. CR102 compensates the change in base-emitter voltage of Q103 over temperature. On the negative going peaks of the I. F. signal, Q103 conducts and on the positive going peaks it is cut off providing detector action. C189 bypasses any remaining I. F. signal and C133 bypasses high frequency audio noise leaving only the desired 90Hz and 150Hz composite video.

I103B is connected as a unity gain voltage follower to isolate the AGC circuit from the detector. I103B charges C134 to the peak DC voltage of the composite signal through R125. This DC voltage, which is proportional to the detector output, is connected to the noninverting input of I103A. The inverting input is connected to a reference voltage established by the voltage divider consisting of R224, CR175, CR177, and R126. CR175 and CR177 provide temperature compensation for the AGC by varying the reference voltage with temperature. R128 and R127 determine the DC gain of the AGC amp and C190 and C191 eliminate any AC gain. When the DC voltage on C124 exceeds the reference voltage, the output of I103A begins to rise. This voltage is fed to the I. F. amplifiers and to the first mixer. As the AGC voltage increases, the gain of the I. F. amplifiers and first mixer is reduced until the detected audio drops to the level of the reference voltage, where a

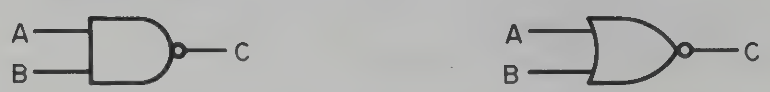
stable point is reached.

4.4.1, f REVIEW OF DIGITAL LOGIC

All of the frequency selector logic used in the Glideslope Receiver is transistor-transistor logic. It employs a nominal operating voltage of +5.0 volts DC.

In the receiver the logic packages are not connected directly to chassis ground, but are grounded through a silicon diode, CR125. This places their virtual ground at +0.7 volt above chassis ground and allows the frequency selector inputs to be grounded through isolation diodes and still stay within acceptable voltage limits for a logic "0" at a gate input. To compensate for this, the operating voltage is raised to +6.0 volts. The integrated circuits still have their nominal operating voltage. The operating voltage is supplied by a zener diode regulator, CR124 and R161.

The logic functions used in the NAND and NOR gates, are summarized in Figure 4-3.



Inputs A	Inputs B	Output C
0	0	1
0	1	1
1	0	1
1	1	0

Inputs A	Inputs B	Output C
0	0	1
0	1	0
1	0	0
1	1	0

FIGURE 4-3 LOGIC FUNCTIONS

The NAND used in the Cessna 800 Glideslope are of the open collector type. They have no internal pull-up circuitry so their outputs may be paralleled.

4.4.1, g FIRST OSCILLATOR AND FREQUENCY SELECTOR

Q104, the first oscillator, is connected in a conventional Colpitts oscillator circuit with diode switching to select one of ten crystals. C137 and C138 form the feedback network. L106 and R131 are connected parallel with the crystal bank to cancel out stray capacity. The output of Q104 is fed through a tuned buffer amplifier, Q105, and used to drive the tripler, Q106. The collector load for Q106 is in the form of two inductors, L109 and L110, etched on the printed circuit board. Q106 drives a low impedance tap on L109. C147 tunes L109 to the third harmonic of the first oscillator frequency. L110, tuned by C151, provides additional selectivity for the third harmonic energy coupled through by C149. A low impedance tap on L110 provides the local oscillator injection for the first mixer through C146.

Crystals Y101 through Y110 are connected to the first oscillator, Q104, through RF switching diodes CR103 through CR112. These diodes are normally reverse biased and provide only a very low capacitance connection between the crystal and oscillator transistor. When one diode, and only one diode, is forward biased by the frequency selector logic, it becomes effectively an extremely low resistance. This connects one crystal to the oscillator transistor and it operates. Resistors R226 through R235 provide a reverse leakage current path for the reverse biased diodes.

For an example of typical operation of the frequency selector logic, assume a localizer frequency of 109.30MHz, 332.00MHz glideslope, has been selected. Refer to Table 4-1 and note that the 1.0MHz wires A and E are grounded and the 0.1MHz wires B and C are grounded.

Observe that NOR gates I114A and I115B now have all of their inputs low. Therefore, their outputs will be high.

Trace the outputs of I114A and I115B to the inputs of the NAND gates connected to the first oscillator crystal bank. Carefully note that NAND gate I108B, and only I108B, has both inputs high. The output of I108B will be low causing current to flow through CR107 and connecting Y105 to the first oscillator.

When an ILS frequency is not selected, none of the NAND gates connected to the first oscillator crystal bank will have both inputs high. Therefore, none of the NAND gate outputs will be low and no crystal will be selected.

TABLE 4-1 LOC/Glideslope Frequency Chart

LOC FREQ. (MHz)	GLIDESLOPE FREQ. (MHz)	FIRST OSC. CRYSTAL	SECOND OSC. CRYSTAL	1.0MHz WIRES GND.	0.1MHz WIRES GND.	0.01MHz WIRES GND.
108.10	334.70	Y110	Y112	AD	AB	
108.15	334.55	Y110	Y111	AD	AB	C
108.30	334.10	Y109	Y112	AD	BC	
108.35	333.95	Y109	Y111	AD	BC	C
108.50	329.90	Y102	Y112	AD	CD	
108.55	329.75	Y102	Y111	AD	CD	C
108.70	330.50	Y103	Y112	AD	DE	
108.75	330.35	Y103	Y111	AD	DE	C
108.90	329.30	Y101	Y112	AD	AE	
108.95	329.15	Y101	Y111	AD	AE	C
109.10	331.40	Y104	Y114	AE	AB	
109.15	331.25	Y104	Y113	AE	AB	C
109.30	332.00	Y105	Y114	AE	BC	
109.35	331.85	Y105	Y113	AE	BC	C
109.50	332.60	Y106	Y114	AE	CD	
109.55	332.45	Y106	Y113	AE	CD	C
109.70	333.20	Y107	Y114	AE	DE	
109.75	333.05	Y107	Y113	AE	DE	C
109.90	333.80	Y108	Y114	AE	AE	
109.95	333.65	Y108	Y113	AE	AE	C
110.10	334.40	Y109	Y114	BE	AB	
110.15	334.25	Y109	Y113	BE	AB	C
110.30	335.00	Y110	Y114	BE	BC	
110.35	334.85	Y110	Y113	BE	BC	C
110.50	329.60	Y101	Y114	BE	CD	
110.55	329.45	Y101	Y113	BE	CD	C
110.70	330.20	Y102	Y114	BE	DE	
110.75	330.05	Y102	Y113	BE	DE	C
110.90	330.60	Y103	Y114	BE	AE	
110.95	330.65	Y103	Y113	BE	AE	C

(Con't.)

TABLE 4-1 LOC/Glideslope Frequency Chart (Continued)

LOC FREQ. (MHz)	GLIDESLOPE FREQ. (MHz)	FIRST OSC. CRYSTAL	SECOND OSC. CRYSTAL	1.0MHz WIRES GND.	0.1MHz WIRES GND.	0.01MHz WIRES GND.
111.10	331.70	Y105	Y112	AB	AB	
111.15	331.55	Y105	Y111	AB	AB	C
111.30	332.30	Y106	Y112	AB	BC	
111.35	332.15	Y106	Y111	AB	BC	C
111.50	332.90	Y107	Y112	AB	CD	
111.55	332.75	Y107	Y111	AB	CD	C
111.70	333.50	Y108	Y112	AB	DE	
111.75	333.35	Y108	Y111	AB	DE	C
111.90	331.10	Y104	Y112	AB	AE	
111.95	330.95	Y104	Y111	AB	AE	C

TABLE 4-1 LOC/GLIDESLOPE FREQUENCY CHART

4.4.1,h SECOND OSCILLATOR AND FREQUENCY SELECTOR

Q107, the second oscillator is also connected as a Colpitts oscillator with diode switching to select one of four crystals. C167 and C168 form from the feedback network. Q108 is a buffer for the second oscillator. Two tuned circuits, C170-L112 and C145-L116, at the output of the buffer, Q108, attenuate spurious frequencies before C172 applies local oscillator injection to the second mixer.

Crystals Y111 through Y114 are connected to the second oscillator by diodes CR153 through CR156.

As an example, again assume a localizer frequency of 109.30MHz, 332.00MHz glideslope, has been selected. From Table 4-1 note that the 1.0MHz wires A and E are grounded and the 0.05MHz wire C is not grounded.

The output of NOR gate I115B will be high and the output of NOR gate I116A will be low. Follow the output of I115B to one input of NOR gate I116B. The output of I116B will be low. Observe that the other input of I116B will be low and that both inputs to NOR gate I116D will be low. The output of I116D will be high.

Of the four NAND gates connected to the second oscillator crystal bank, only I111D has both inputs high so its output will be low. Current will flow through CR156 and connect Y114 to the oscillator circuit.

4.4.1,i DEVIATION CONVERTER

Composite video from the detector, Q103, is coupled through the course width adjustment control, R194, into two active filters. I104A and its associated components C173, C174, C175, R202, R203, and R204 form a bridged-T type active filter tuned to 90Hz. I104B and C176, C178, C179, R196, R197, and R209 form an active filter tuned to 150Hz. The composite video applied to each filter is separated into its component parts and amplified. A DC reference voltage is established for the entire converter by zener diode CR167 and R207. By connecting the noninverting inputs of the filter amplifiers, I104A and I104B, the quiescent level of their outputs approximately equals the DC reference voltage.

The detector filter capacitors C183 and C184 also rest at the DC reference voltage with no signal applied.

Now assume AC signals are present at the active filter outputs. Capacitors C181 and C182 couple the signals to the detector diodes, CR165 and CR166 for 90Hz and CR168 and CR169 for 150Hz. When the signals swing positive from the reference voltage by an amount greater than the gap voltage of CR166 and CR169, the diodes conduct and charge C184 and C183 respectively, to the peak values of the AC signals. On the negative portions of the swing, CR165 and CR168 conduct and maintain the proper voltage polarity on C181 and C182.

C183 and C184 are now charged to a voltage higher than the DC reference of CR167. The voltage dividers of R195 and R210 for 90Hz and R200 and R201 for 150Hz serve dual purposes. First, they are discharge paths for the higher voltage on C183 and C184. However, the discharge time constant is longer than the period of the applied AC signal, so C183 and C184 are kept charged until the signal is removed. Second, the division ratio on the 90Hz side is fixed while the 150Hz side is variable with R200. This is a centering adjustment to compensate for slight variations in the two channels.

I105A and I105B are connected as unity gain voltage followers for isolation to prevent the deviation outputs from loading the detectors.

The deviation loads are connected directly between the outputs of I105A and I105B. Current may flow through R213, the deviation loads, and R219 in either direction depending upon which tone amplitude is greater. CR172 and CR173 limit the maximum current which may flow in the deviation loads by limiting the maximum voltage across them.

The warning flag loads are driven by summing current flow from both sides through R214 and R218, the flag load, R211, CR170, and using the DC reference as a return point. R211 adjusts flag current and CR171 and CR174 limit maximum current. Thermistor RT101 provides temperature compensation for the flag circuit.

The converter is adjusted to drive a specific number of loads. When the number of external loads is less than the required number, simulated loads in the form of resistors internal to the unit are connected across the external loads. R165, R216, and R217 are deviation loads and R163 and R215 are flag loads.

4.4.1, j POWER SUPPLY

The power supply regulator is a conventional series pass regulator. By varying the base drive to Q110, the pass transistor, its total collector to emitter voltage drop may be varied. R222 allows adjustment of the regulated voltage. Assume that the circuit is producing a given voltage on the regulated line. If the regulated voltage increases slightly, part of the increase will appear at the base of Q111 through the voltage divider consisting of R222 and R223. Since the emitter of Q111 is connected to a stable voltage reference, zener diode CR176, the increase in base voltage will cause an increase in base current and hence an increase in collector current. This increases the voltage drop across R220 and lowers the base drive for Q110 which lowers its emitter voltage. The regulator has compensated for the initial change in voltage.

Q109 functions as a switch to turn the regulator on and off for the ILS energize function. With the ILS energize wire open, Q109 receives base drive through R159 and R160 and saturates. This clamps the base of Q110 to ground and turns the regulator off. When an ILS channel is selected, the ILS energize wire is grounded, Q109 is cut off, and the regulator functions normally.

SECTION V

ILLUSTRATED PARTS LISTS

FINAL ASSEMBLY

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	047-1313-00	Bottom Panel	1
	047-1321-02	Rear Panel	1
	047-1374-00	Cover	1
	047-2475-05	Front Panel	1
	057-1417-01	I. D. Tag with Serial Number	1
	089-5436-03	Screw F. H. PH, #4-40 × 3/16	3
	089-5436-04	Screw F. H. PH, #4-40 × 1/4	3
	089-5907-06	Screw PHP, #6-32 × 3/8	4
	089-5927-04	Screw, Binder H. PH #4-40 × 1/4	8
	089-5931-06	Screw, Binder H. PH #6-32 × 3/8	4
	089-6043-04	Screw, Self-Tapping #4-40 × 1/4 SS	2
	200-0002-00	Marker Chassis Assembly	1
	200-0206-00	Autopilot Trip Adaptor Assembly	1
	200-0402-00	Glideslope Chassis Assembly	1

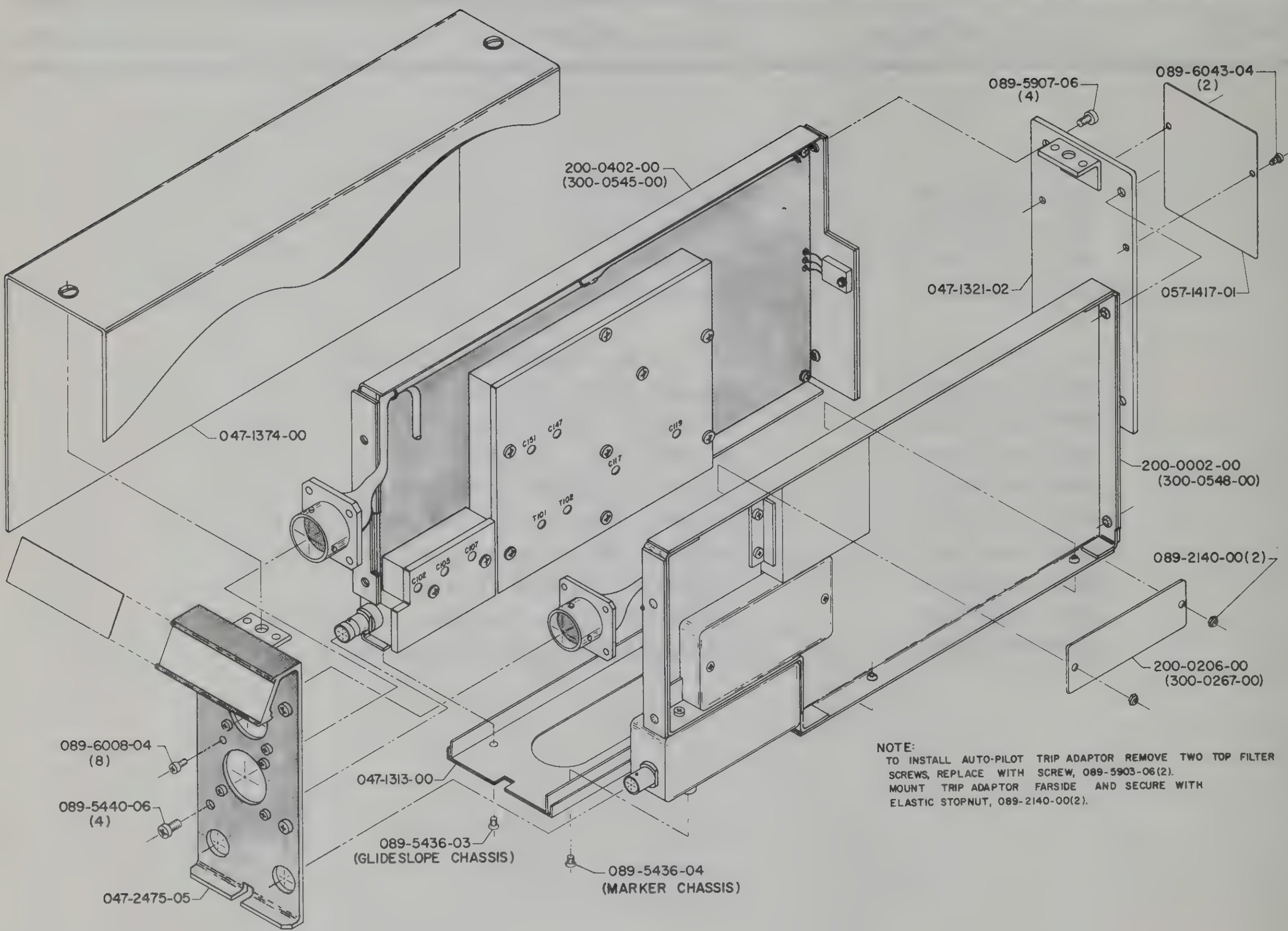


FIGURE 5-1 FINAL ASSEMBLY

GLIDESLOPE CHASSIS ASSEMBLY

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	008-0005-01	Lug Wire Harness	2
	016-1004-00	Thermal Compound	
	047-2461-02	Cover Osc. & I. F.	1
	047-2472-01	Shield Mixer	1
	047-2477-02	Chassis Glideslope	1
	047-2506-02	Cover Preselector	1
	089-2076-30	Nut Hex #4-40	1
	089-2104-22	Speednut #4	10
	089-5436-06	Screw F. H. P. #4-40 x 3/8	1
	089-5903-04	Screw PHP #4-40 x 1/4	6
	089-5927-03	Screw BHP #4-40 x 3/16	10
	089-8003-34	Washer S/L #4	6
	150-0048-00	Tubing Shrink	.25
	187-1056-01	Xtal Cushion	1
	187-1056-02	Xtal Cushion	1
	200-0403-00	P. C. Board Ass'y.	1
	200-0404-00	Harness Ass'y.	1
Q110	007-0213-00	Tstr Sil 2N5191	1

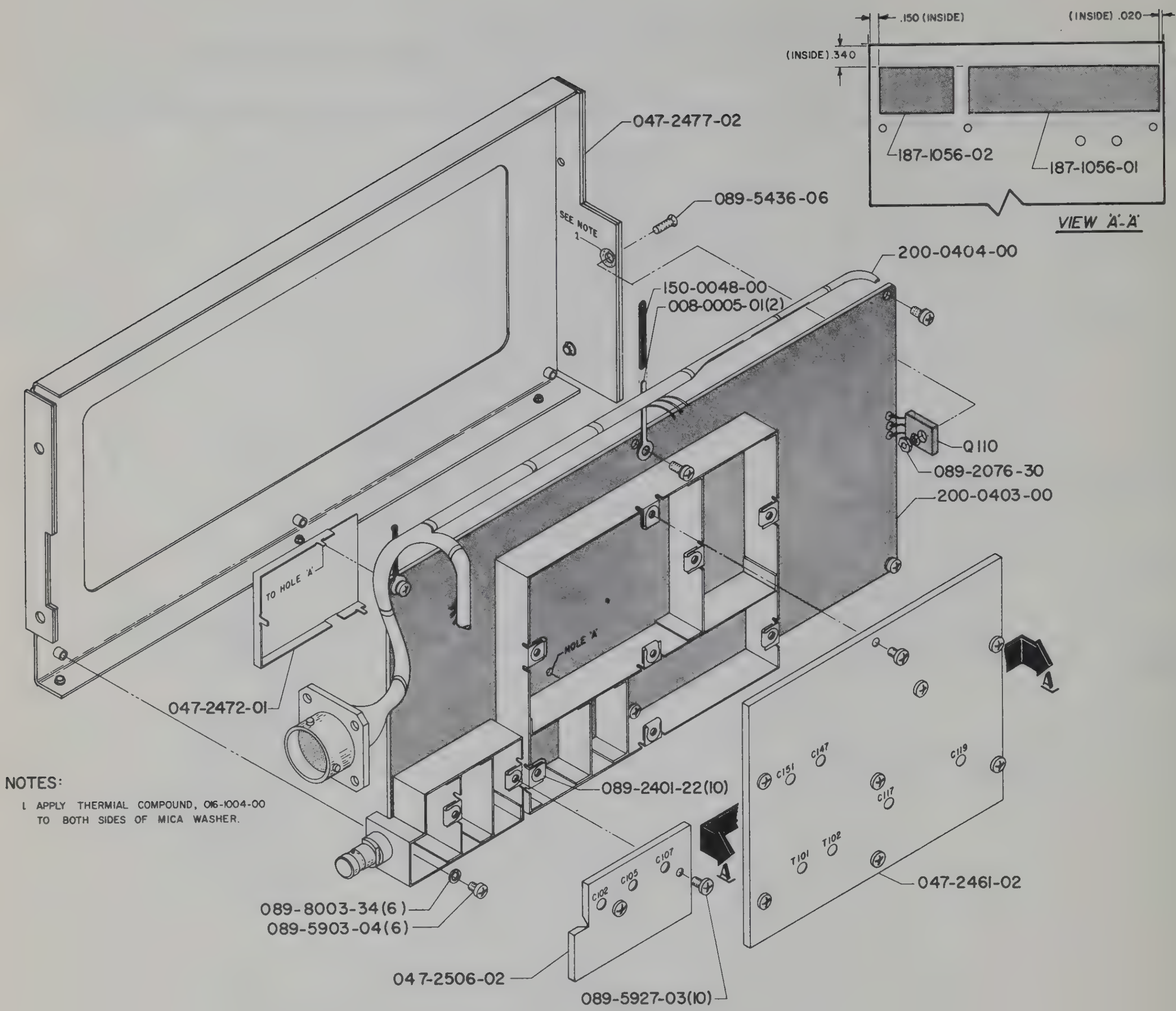


FIGURE 5-2 GLIDESLOPE CHASSIS ASSEMBLY

GLIDESLOPE RECEIVER (SEE FIGURE 6-4)

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	009-5223-01	P.C. Board	1
	026-0003-00	Wire, Tinned, Copper #22	1
	047-2458-01	Fence, Osc. & I. F.	1
	047-2504-02	Fence, Preselector	1
	088-0066-00	Xtal Spacer	14
	089-8033-55	Washer, I. T. Lock	1
C101	113-5471-00	Cap D/C 470pf X5F	1
C102	102-0009-33	Cap Var 7-25pf N300	1
C104	113-5102-00	Cap D/C .001μf X5F	1
C105	102-0009-33	Cap Var 7-25pf N300	1
C107	102-0009-33	Cap Var 7-25pf N300	1
C108	113-3015-00	Cap D/C 1.5pf	1
C109	104-0001-09	Cap D/M 47pf 5%	1
C110	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C111	113-3220-00	Cap D/C 22pf N150	1
C112	113-5102-00	Cap D/C .001μf X5F	1
C113	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C114	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C115	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C116	113-5102-00	Cap D/C .001μf X5F	1
C117	102-0009-37	Cap Var 9-35pf N650	1
C118	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C119	102-0009-37	Cap Var 9-35pf N650	1
C120	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C121	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C122	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C123	113-3047-01	Cap D/C 4.7pf N470	1
C124	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C125	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C126	113-3330-00	Cap D/C 33pf N150	1
C127	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C128	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C129	113-3100-00	Cap D/C 10pf N150	1
C130	109-0007-00	Cap D/C 0.01 25V 30%	1
C131	109-0007-00	Cap D/C 0.01 25V 30%	1
C132	109-0007-00	Cap D/C 0.01 25V 30%	1
C133	114-7104-00	Cap D/C 0.1μf X5R	1
C134	096-1005-00	Cap Tant 1μf 35V 20%	1
C135	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C136	096-1005-00	Cap Tant 1μf 35V 20%	1
C137	104-0001-44	Cap D/M 56pf 5%	1
C138	104-0001-45	Cap D/M 43pf 5%	1

GLIDESLOPE RECEIVER (Continued)

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
C139	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C140	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C141	113-3100-00	Cap D/C 10pf N150	1
C142	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C143	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C144	113-5471-00	Cap D/C 470pf X5F	1
C145	113-3068-00	Cap D/C 6.8pf N150	1
C146	113-3220-00	Cap D/C 22pf N150	1
C147	102-0009-33	Cap Var 7-25pf N300	1
C148	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C149	106-0001-33	Cap F/C 4.7pf 5%	1
C150	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C151	102-0009-33	Cap Var 7-25pf N300	1
C152 Thru C166	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C167	104-0001-44	Cap D/M 56pf 5%	1
C168	104-0001-45	Cap D/M 43pf 5%	1
C169	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C170	113-3068-00	Cap D/C 6.8pf N150	1
C171	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C172	113-5022-00	Cap D/C 2.2pf N150	1
C173	108-5016-74	Cap P/C 0.1μf 5%	1
C174	108-5016-74	Cap P/C 0.1μf 5%	1
C175	108-5016-68	Cap P/C 0.068μf 5%	1
C176	108-5016-68	Cap P/C 0.068μf 5%	1
C177	096-1005-00	Cap Tant 1μf 35V 20%	1
C178	108-5016-74	Cap P/C 0.1μf 5%	1
C179	108-5016-74	Cap P/C 0.1μf 5%	1
C180	096-1005-00	Cap Tant 1μf 35V 20%	1
C181	096-1007-00	Cap Tant 2.2μf 20V 20%	1
C182	096-1007-00	Cap Tant 2.2μf 20V 20%	1
C183	096-1003-00	Cap Tant 4.7μf 10V 20%	1
C184	096-1003-00	Cap Tant 4.7μf 10V 20%	1
C185	096-1005-00	Cap Tant 1μf 35V 20%	1
C186	097-0057-34	Cap Elect 470μf 25V	1
C187 Thru C189	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C190	096-1007-00	Cap Tant 2.2μf 20V 20%	1
C191	096-1007-00	Cap Tant 2.2μf 20V 20%	1
C192	109-0007-00	Cap D/C 0.01μf 25V 30%	1
C193	109-0007-00	Cap D/C 0.01μf 25V 30%	1

GLIDESLOPE RECEIVER (Continued)

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
C194	096-1007-00	Cap Tant 2.2μf 20V 20%	1
C200	096-1007-00	Cap Tant 2.2μf 20V 20%	1
C201	113-3220-00	Cap D/C 22pf N150	1
CJ103	026-0018-00	Circuit Jumper	1
CJ104	026-0018-00	Circuit Jumper	1
CR101	007-6029-00	Diode Sil 1N457	1
CR102	007-6035-00	Diode Sil 1N816	1
CR103 Thru CR112	007-6070-00	Diode Sil Switching MPN3401	1
CR113 Thru CR122	007-6033-00	Diode Germ 1N270	1
CR123	007-6029-00	Diode Sil 1N457	1
CR124	007-5011-00	Diode Zener 6.2V	1
CR125	007-6024-00	Diode Sil 1.0A 50 PIV	1
CR153 Thru CR156	007-6070-00	Diode Sil Switching MPN3401	1
CR165	007-6029-00	Diode Sil 1N457	1
CR166	007-6029-00	Diode Sil 1N457	1
CR167	007-5011-08	Diode Zener 8.2V	1
CR168 Thru CR174	007-6029-00	Diode Sil 1N457	1
CR175	007-6035-00	Diode Sil 1N816	1
CR176	007-5011-08	Diode Zener 8.2V	1
CR177	007-6035-00	Diode Sil 1N816	1
FL101	017-0039-00	Filter Xtal 21.400MHz	1
I101	120-3020-00	I.C. IF Amp MC1350P	1
I102	120-3020-00	I.C. IF Amp MC1350P	1
I103 Thru I105	120-3022-02	I.C. Dual OP-AMP S55581	1
I106 Thru I111	120-0048-01	I.C. Quad 2-Input NAND SN7401	1
I112 Thru I114	120-0002-00	I.C. Quad 2-Input Pos Nor SN7402	1
J694	030-0029-00	Conn BNC Male	1
L104	019-2084-27	Choke Molded 1.8μh 10%	1
L105	019-2084-23	Chaoke Molded 1.2μh 10%	1

GLIDESLOPE RECEIVER (Continued)

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
L106	019-2084-09	Choke Molded .33μh 10%	1
L107	019-2084-15	Choke Molded .56μh 10%	1
L108	019-2084-01	Choke Molded 15μh 10%	1
L111	019-2084-53	Choke Molded 22μh 10%	1
L112	019-2084-21	Choke Molded 1μh 10%	1
L113	019-2084-47	Choke Molded 12μh 10%	1
L115	019-2084-35	Choke Molded 3.9μh 10%	1
L116	019-2084-17	Choke Molded .68μh 10%	1
L117	019-2084-05	Choke Molded .22μh 10%	1
L118	019-2084-05	Choke Molded .22μh 10%	1
Q101	007-0028-00	Tstr Sil SE3001	1
Q102	007-0196-00	Tstr Sil MPS-H20	1
Q103	007-0119-00	Tstr Sil 2N4917	1
Q104	007-0134-00	Tstr Sil SE3005	1
Q105	007-0028-00	Tstr Sil SE3001	1
Q106	007-0028-00	Tstr Sil SE3001	1
Q107	007-0134-00	Tstr Sil SE3005	1
Q108	007-0028-00	Tstr Sil SE3001	1
Q109	007-0078-01	Tstr Sil 2N3417	1
Q111	007-0135-00	Tstr 2N5307	1
R101	130-0222-25	Res F/C 2.2K 10% QW	1
R102	130-0333-25	Res F/C 33K 10% QW	1
R103	130-0682-25	Res F/C 6.8K 10% QW	1
R104	130-0752-23	Res F/C 7.5K 5% QW	1
R105	130-0102-25	Res F/C 1K 10% QW	1
R106	130-0102-25	Res F/C 1K 10% QW	1
R107	130-0682-25	Res F/C 6.8K 10% QW	1
R108	130-0392-25	Res F/C 3.9K 10% QW	1
R109	130-0103-25	Res F/C 10K 10% QW	1
R110	130-0103-25	Res F/C 10K 10% QW	1
R111	130-0471-25	Res F/C 470 10% QW	1
R112	130-0102-25	Res F/C 1K 10% QW	1
R113	130-0242-23	Res F/C 2.4K 5% QW	1
R114	130-0331-25	Res F/C 330 10% QW	1
R115	130-0332-25	Res F/C 3.3K 10% QW	1
R116	130-0333-25	Res F/C 33K 10% QW	1
R117	130-0333-25	Res F/C 33K 10% QW	1
R118	130-0331-25	Res F/C 330 10% QW	1
R119	130-0332-25	Res F/C 3.3K 10% QW	1
R120	130-0272-25	Res F/C 2.7K 10% QW	1
R121	130-0151-23	Res F/C 150 5% QW	1
R122	130-0471-25	Res F/C 470 10% QW	1

GLIDESLOPE RECEIVER (Continued)

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
R123	130-0103-25	Res F/C 10K 10% QW	1
R124	130-0472-25	Res F/C 4.7K 10% QW	1
R125	130-0104-25	Res F/C 100K 10% QW	1
R126	130-xxxx-23	Sel Value (See Res List)	
	130-0472-23	Res F/C 4.7K 5% QW	1
	130-0512-23	Res F/C 5.1K 5% QW	1
	130-0562-23	Res F/C 5.6K 5% QW	1
	130-0622-23	Res F/C 6.2K 5% QW	1
	130-0682-23	Res F/C 6.8K 5% QW	1
R127	130-0103-25	Res F/C 10K 10% QW	1
R128	130-0105-25	Res 1MEG 10% QW	1
R129	130-0101-25	Res F/C 100 10% QW	1
R130	130-0472-25	Res F/C 4.7K 10% QW	1
R131	130-0221-23	Res F/C 220 5% QW	1
R132	130-0331-25	Res F/C 330 10% QW	1
R133	130-0391-25	Res F/C 390 10% QW	1
R134	130-0102-25	Res F/C 1K 10% QW	1
R135	130-0101-25	Res F/C 100 10% QW	1
R136	130-0102-25	Res F/C 1K 10% QW	1
R137	130-0104-25	Res F/C 100K 10% QW	1
R138	130-0101-25	Res F/C 100 10% QW	1
R139 Thru R148	130-0152-25	Res F/C 1.5K 10% QW	1
R149	130-0562-25	Res F/C 5.6K 10% QW	1
R150	130-0101-25	Res F/C 100 10% QW	1
R151	130-0101-25	Res F/C 100 10% QW	1
R152	130-0331-25	Res F/C 330 10% QW	1
R153	130-0391-25	Res F/C 390 10% QW	1
R154	130-0471-25	Res F/C 470 10% QW	1
R155 Thru R158	130-0152-25	Res F/C 1.5K 10% QW	1
R159	130-0103-25	Res F/C 10K 10% QW	1
R160	130-0103-25	Res F/C 10K 10% QW	1
R161	132-0107-57	Res WW 110 5% 3W	1
R162	130-0102-25	Res F/C 1K 10% QW	1
R163	130-0511-23	Res F/C 510 5% QW	1
R164	130-0101-25	Res F/C 100 10% QW	1
R165	130-0511-23	Res F/C 510 5% QW	1

GLIDESLOPE RECEIVER (Continued)

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
R179 Thru R192	130-0103-25	Res F/C 10K 10% QW	1
R194	133-0072-15	Res Var 10K 20%	1
R195	136-3922-22	Res PF 39.2K 1% QW	1
R196	136-1051-72	Res PF 1.05K 1% EW	1
R197	136-1073-22	Res PF 107K 1% QW	1
R198	136-8061-22	Res PF 8.06K 1% QW	1
R199	136-8061-22	Res PF 8.06K 1% QW	1
R200	133-0072-21	Res Var 50K 20%	1
R201	136-1213-22	Res PF 121K 1% QW	1
R202	136-6041-72	Res PF 6.04K 1% EW	1
R203	136-1741-77	Res PF 1.74K 1% EW	1
R204	136-1783-22	Res PF 178K 1% QW	1
R205	130-0101-25	Res F/C 100 10% QW	1
R206	136-8061-22	Res PF 8.06K 1% QW	1
R207	130-0681-23	Res F/C 680 5% QW	1
R208	136-8061-22	Res PF 8.06K 1% QW	1
R209	136-3481-72	Res PF 3.48K 1% EW	1
R210	136-1213-22	Res PF 121K 1% QW	1
R211	133-0072-09	Res Var 1K 20%	1
R212	130-0101-25	Res F/C 100 10% QW	1
R213	136-7500-22	Res PF 750 1% QW	1
R214	136-2370-22	Res PF 237 1% QW	1
R215 Thru R217	130-0102-23	Res F/C 1K 5% QW	1
R218	136-2370-22	Res PF 237 1% QW	1
R219	136-7500-22	Res PF 750 1% QW	1
R220	130-0102-33	Res F/C 1K 5% HW	1
R221	130-0681-23	Res F/C 680 5% QW	1
R222	133-0072-15	Res Var 10K 20%	1
R223	130-0392-25	Res F/C 3.9K 10% QW	1
R224	130-0682-25	Res F/C 6.8K 10% QW	1
R225	130-0101-25	Res F/C 100 10% QW	1
R226 Thru R239	130-0105-25	Res 1MEG 10% QW	1
RT101	134-1009-00	TMTR 500 10%	1
T101	019-3048-00	Trans 75MHz RF	1
T102	019-3048-00	Trans 75MHz RF	1
T103	019-8042-00	Trans 10.7MHz IF	1
T104	019-8042-00	Trans 10.7MHz IF	1

GLIDESLOPE RECIEVER (Continued)

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
TP101	010-0022-07	Test Point Yellow	1
TP102	010-0022-04	Test Point Green	1
TP103	010-0022-12	Test Point Violet	1
TP104	010-0022-13	Test Point Gray	1
TP105	010-0022-02	Test Point Red	1
TP106	010-0022-06	Test Point Orange	1
Y101	044-0048-00	Xtal 85.125MHz	1
Y102	044-0048-01	Xtal 85.325MHz	1
Y103	044-0048-02	Xtal 85.525MHz	1
Y104	044-0048-03	Xtal 85.725MHz	1
Y105	044-0048-04	Xtal 85.925MHz	1
Y106	044-0048-05	Xtal 86.126MHz	1
Y107	044-0048-06	Xtal 86.325MHz	1
Y108	044-0048-07	Xtal 86.525MHz	1
Y109	044-0048-08	Xtal 86.725MHz	1
Y110	044-0048-09	Xtal 86.925MHz	1
Y111	044-0047-00	Xtal 52.375MHz	1
Y112	044-0047-01	Xtal 52.525MHz	1
Y113	044-0047-02	Xtal 52.675MHz	1
Y114	044-0047-03	Xtal 52.825MHz	1

CESSNA 800 GLIDE SLOPE/MARKER BEACON RECEIVER INSTALLATION AND BENCH TEST KITS		
QTY.	DESCRIPTION	PART NUMBER
	066-1035-00 GLIDE SLOPE RECEIVER INSTALLATION KIT	
1	Connector BNC, Male	030-0005-00
1	Connector BNC, Female	030-0028-00
1	Connector, 26 Pin	030-2070-00
1	Connector, 19 Pin	030-2074-01
1	Mounting Rack	071-4004-00
	050-1105-00, CESSNA 800 GLIDE SLOPE/MARKER BEACON RECEIVER BENCH TEST KIT	
1	Connector, Co-Ax, BNC, UG-88/U	030-0005-00
1	Connector, Co-Ax, MB 45000	030-0048-00
1	Connector, 55 Pin	030-2073-00
1	Connector, 19 Pin	030-2074-00
1	Connector, 19 Pin	030-2074-01
1	Deviation Meter, 50-0-50μa, 1000Ω, 1%, 1μa graduations and 150-0-150μa, 1000Ω, 1%, 3μa graduations (or provision for padding 50-0-50 meter to 150-0-150 See note below). NOTE: To increase the range of the Deviation Meter to 150-0-150μa, connect a 2KΩ, 1% resistor in series with the meter movement. Connect a 1. 5KΩ, 1% resistor in parallel with the 2KΩ resistor and meter movement. The two resistors should be connected such that both resistors may be switched "into" or "out" of the meter movement circuit.	Ref. Triplett #420
1	Flag Meter, 0-500μa, 1000Ω, 1%, 10 a graduations	Ref. Triplett #420
1	Lamp Voltage Meter, 0-10vdc, 1000Ω, 1 Volt, 0. 2V	Ref. Simpson #1227

GLIDESLOPE/MARKER RECEIVER

SECTION VI

MAINTENANCE

6.1 GENERAL

Maintenance information contained in this section includes inspection procedures, cleaning, semiconductor replacement, troubleshooting, and alignment procedures. For maintenance procedures for the Cessna 800 Marker Beacon, refer to Part I of this manual.

6.2 VISUAL INSPECTION

The following visual inspection procedures should be performed during the course of maintenance operations:

a. Inspect all wiring for frayed, loose, or burned wires.

b. Check cable connections, making sure the plugs are free from corrosion and are properly secured.

c. Check all components for evidence of overheating, breakage, vibration, corrosion, or loose connections.

d. Check all capacitors and transformers for leaks, bulges, or loose connections.

6.3 CLEANING

a. Using a clean lint-free cloth lightly moistened with an approved cleaning solvent, remove the foreign matter from the equipment case and unit front panels. Wipe dry using a clean, dry, lint-free cloth.

b. Using a hand controlled dry air jet (not more than 15psi), blow the dust from inaccessible areas. Care should be taken to prevent damage by the air blast.

c. Clean the receptacles and plugs with a hand controlled dry air jet (not more than 25 psi) and a clean lint-free cloth lightly moistened with an approved cleaning solvent. Wipe dry with a clean, dry, lint-free cloth.

6.4 SEMICONDUCTOR REPLACEMENT

It is recommended that semiconductors not be tested or replaced until unsatisfactory performance is observed.

6.5 SEMICONDUCTOR MAINTENANCE

6.5.1 GENERAL

Due to the wide utilization of semiconductors in this electronic equipment, somewhat different techniques are necessary in maintenance procedures. In solid state circuits the impedances and resistances encountered are of much lower values than those encountered in vacuum-tube circuits. Therefore, a few ohms discrepancy can greatly affect the performance of the equipment. Also, coupling and filter capacitors are of larger values and usually are of the tantalum type. Hence, when measuring resistances, an instrument very accurate in the low resistance ranges must be used, and when measuring values of capacitors, an instrument accurate in the high ranges must be employed. Capacitor polarity must be observed when measuring resistance. Usually more accurate measurements can be obtained if the semiconductors are removed or disconnected from the circuit.

6.5.2 SEMICONDUCTOR TEST EQUIPMENT

Damage to semiconductors by test equipment is usually the result of accidentally applying too m current or voltage to the elements. Common causes of damage from test equipment are discussed in the following paragraphs.

6.5.2.1 TRANSFORMERLESS POWER SUPPLIES

Test equipment with transformerless power supplies is one sourse of high current. However, this type of test equipment can be used by employing an isolation transformer in the AC power line.

6.5.2.2 LINE FILTER

It is still possible to damage semiconductors from line current, even though the test equipment has a power transformer in the power supply, if the test equipment is provided with a line filter. This filter may function as a voltage divider and apply half voltage to the semiconductor. To eliminate this condition, connect a ground wire from the chassis of the equipment under test before making any other connections.

6.5.2.3 LOW-SENSITIVITY MULTIMETERS

Another cause of semiconductor damage is a multimeter that requires excessive current to provide adequate indications. Multimeter with sensitivities of less than 20,000-ohms-per-volt should not be used on semiconductors. A multimeter with low sensitivity will draw too much current through many types of small semiconductors, causing damage. When in doubt as to the amount of current supplied by a multimeter, check the multimeter circuits on all scales with an external low-resistance multimeter connected in series with the multimeter leads. If more than one milliampere is drawn by the multimeter on any range, this range cannot be safely used on small semiconductors.

6.5.2.4 POWER SUPPLY

When using a battery-type power supply, always use fresh batteries of the proper value. Make certain that the polarity of the power supply is correct for the equipment under test. Do not use power supplies having poor voltage regulation.

6.5.3 SEMICONDUCTOR VOLTAGE AND RESISTANCE MEASUREMENT

When measuring voltage or resistances in circuits containing semiconductor devices, remember that these components are polarity and voltage conscious. Since the values of capacitors used in semiconductor circuits are usually large (especially in audio, servo, or power circuits) time is required to charge these capacitors when an ohmmeter is connected to a circuit in which they appear. Thus, any reading obtained is subject to error if sufficient time is not allowed for the capacitor to fully charge. When in doubt it may be best in some cases to isolate the components in question and measure them individually.

6.5.4 TESTING OF TRANSISTORS

A transistor checker should be used to properly evaluate transistors. If a transistor tester is not available, a good multimeter may be used. Make sure that the multimeter meets the requirements outlined in preceding paragraph 6.5.2.3.

6.5.4.1 PNP TRANSISTOR

To check a PNP transistor, connect the positive lead of the multimeter to the base of the transistor

and the negative lead to the emitter. Generally, a resistance reading of 50,000 ohms or more should be obtained. Reconnect the multimeter with the negative lead to the base. With the positive lead connected to the emitter a resistance value of 500 ohms or less should be obtained. When the positive lead is connected to the collector a value of 500 ohms or less should be likewise obtained.

6.5.4.2 NPN TRANSISTOR

Similar tests made on an NPN transistor should produce the following results: With the negative lead of the multimeter connected to the base of the transistor the value of resistance between the base and the collector should be high. With the positive lead of the multimeter connected to the base, the value of resistance between the base and the collector should be low. If these results are not obtained, the transistor is probably defective and should be replaced.

—CAUTION—

If a transistor is found to be defective, make certain that the circuit is in good operating order before installing a replacement transistor. If a short circuit exists in the circuit, putting in another transistor will most likely result in burning out the new component. Do not depend upon fuses to protect transistors.

6.5.4.3 TRANSISTOR BIASING

Always check the value of the bias resistors in series with the various transistor elements. A transistor is very sensitive to improper bias voltage; therefore, a short or open circuit in the bias resistance may damage the transistor. For this reason, do not troubleshoot by shorting the various points in the circuit to ground and listening for clicks.

6.5.5 REPLACING SEMICONDUCTORS

Never remove or replace a plug-in semiconductor with the supply voltage turned on. Transients thus produced may damage the semiconductor or others remaining in the circuit. If a semiconductor is to be evaluated in an external test circuit, be sure that no more voltage is applied to the semiconductor than normally is used in the circuit from which it came.

6.5.5.1 Use only a low heat soldering iron when installing or removing soldered-in-parts. Use care in the handling of printed circuit boards. When removing a part from a printed circuit board, first unbend the crimped leads. Use only the necessary amount of heat to unsolder the part. Clear excess solder from mounting eyelets, making sure that mounting holes are clear before installing new parts. When removing a transformer or other part having a multiple number of leads, straighten (unbend) all leads first and then heat leads one at a time, working around the part, until the part can be gently "rocked out".

6.5.5.2 When installing or removing a soldered-in semiconductor grasp the lead to which heat is applied between the solder joint and the semiconductor with long-nosed pliers. This will dissipate some of the heat that would otherwise conduct into the semiconductor from the soldering iron. Make certain that all wires soldered to semiconductor terminals have first been properly tinned so that the necessary connection can be made quickly. Excessive heat will permanently damage a semiconductor.

6.5.5.3 When soldering is required to remove a component from a semiconductor socket, remove the semiconductor to prevent damage to the semiconductor.

6.5.5.4 In some cases, power transistors are mounted on heat-sinks that are designed to dissipate heat away from them. In some power circuits, the transistor must also be insulated from ground. Often, this insulating is accomplished by means of insulating washers made of fiber and mica. When replacing transistors mounted in this manner, be sure that the insulating washers are replaced in proper order. Before installing the mica washers, treat them with a film of thermal compound. This treatment helps in the transfer of heat. After the transistor is mounted, and before making any connections check from the case of the transistor to ground with a multimeter to see that the insulation is effective.

6.6 ASSEMBLY/DISASSEMBLY PROCEDURES

6.6.1 DISASSEMBLY

1. Loosen two Dzus screws on the cover and remove cover.
2. Remove six screws holding the bottom plate to the unit and remove bottom plate.
3. Remove four screws holding rear plate to unit and remove rear plate.
4. Remove two screws holding marker receiver chassis to front plate and four screws holding marker receiver power connector to front plate and remove marker receiver chassis.
5. Remove two screws holding glideslope receiver chassis to front plate and four screws holding glideslope receiver power connector to front plate and remove glideslope receiver chassis.
6. Remove eight screws holding Oscillator/IF cover to the P.C. Board and remove cover.
7. Remove two screws holding Preselector cover to the P.C. Board and remove cover.
8. Remove the screw holding Q110 to the chassis. Note the special torque washer on the screw. Take care to protect the mica washer between Q110 and the chassis. Coat the mica washer with heat sink compound, KPN 016-1004-00, before re-assembly.
9. Remove six screws holding P.C. Board to chassis and remove the P.C. Board.

6.6.2 ASSEMBLY

Re-assembling the unit is accomplished by reversing the procedure outlined in paragraph 6.6.1, Disassembly.

6.7 TEST EQUIPMENT

The following test equipment, or equivalent, is required to properly align the Glideslope Receiver. All test equipment must be properly calibrated before adjustments are started.

DESCRIPTION	CHARACTERISTICS REQUIRED	REPRESENTATIVE TYPE
a. Test Panel	See Figure 6-1	
b. D.C. Power Supply	0-50VDC, 1.5amp	Heath IP-27

DESCRIPTION		CHARACTERISTICS REQUIRED	REPRESENTATIVE TYPE
c.	D.C. VTVM	Input Impedance: 2 megohms Voltage range: 1 volt to 100 volts	Eldorado Model 1820A
d.	A.C. VTVM	Input Impedance: 2 megohms Voltage range: 1 millivolt to 100 volts. Scale calibrated in decibels.	Hewlett Packard Model 3400A
e.	R.F. VTVM	Voltage range: 10 millivolts to 10 volts. Frequency range: 1MHz to 500MHz.	Hewlett Packard Model 414A
f.	Glideslope Signal Generator	Frequency range: 329.3MHz to 335.0MHz	Boonton Model 232A
g.	R.F. Signal Generator	Frequency range: 10MHz to 480MHz	Hewlett Packard Model 608E
h.	Audio Generator	Frequency range: 5Hz to 600KHz	Hewlett Packard Model 200 CD
i.	Oscilloscope	Vertical: 0.05 volt/div., Horizontal: 0.2μsec/div.	Tektronix Model 515
j.	6db Attenuator	Input-Output Impedance: 50 ohms Attenuation 6.0db	Texcan Corporation Model FP-5016
k.	Coaxial Cable 50 ohms	BNC connector to open end with small alligator clips.	

6.8 ALIGNMENT PROCEDURES

6.8.1 ALIGNMENT PROCEDURE

6.8.1.1 INITIAL SETTINGS

A. Preset Potentiometers as listed below.

1. R200 and R222 - center of range
2. R194 and R211 - maximum ccw

B. Preset Transformers as listed below.

1. T101, 102, 104 - top of slug approximately 1/8 inch from top of transformer.
2. T103 - top of slug even with top of transformer.

6.8.1.2 REGULATED 16VDC ADJUSTMENT

A. Connect unit to test fixture through cable to J692.

B. Adjust D.C. power supply source for 27.5 ±0.1VDC. Turn on power to unit.

C. Connect DC voltmeter to TP6 (orange test point) and adjust R222 for a reading of 16 ±0.1VDC on meter.

6.8.1.3 21.4MHz IF ALIGNMENT

A. Connect audio voltmeter to TP1 (yellow test point) and select 1 volt RMS range.

B. Set 608E generator to 21.4MHz modulated 30% at 1000Hz. Connect cable (item K) to 608E generator.

C. Following procedure is done with signal insertion, adjusting generator level to maintain one third scale reading on audio voltmeter.

1. Clip center conductor of cable from generator to body of C126 (cable shield to chassis ground). Adjust T104 for maximum audio at TP1.

2. Clip center conductor of cable to body of C104 and adjust T103 for maximum audio at TP1.

3. Clip center conductor of cable to body of C116 and adjust C119 and C117 for maximum audio.

6.8.1.4 74.2MHz IF ALIGNMENT

A. Adjust frequency selector on test fixture to 109.30MHz. (Leave selector on this frequency for balance of alignment).

B. Connect cable (item K) to 608E gen. and adjust frequency to 74.225MHz, modulated 30% at 1000Hz.

C. Connect audio voltmeter to TP1 (yellow test point) and use signal insertion procedure as in paragraph 6.8.1.3 as follows:

1. Clip center conductor of cable to body of C112 and adjust T102 for maximum audio.

2. Clip center conductor of cable to body of C109 and adjust T101 for maximum audio.

NOTE: At this point it may be necessary to adjust 1st oscillator capacitors C147 and C151 to get adequate signal level through 1st mixer. If increase in audio is not obtained, connect RF millivoltmeter to junction of C146 and L110 and adjust C147/C151 for maximum RF.

6.8.1.5 PRESELECTOR ALIGNMENT

A. Connect 232A generator through 6db pad to J694 on unit.

B. Adjust generator frequency to 332.0MHz, modulate 40% each with 90Hz and 150Hz and set tone ratio to 0db.

C. While metering audio at TP1 (yellow test point) as in paragraph 6.8.1.3 and 6.8.1.4, adjust C102, 105 and 107 for maximum audio.

6.8.1.6 1st OSCILLATOR AND FINAL ALIGNMENT

A. With 232A set as in paragraph 6.8.1.5 and preselector and OSC/IF covers installed make following adjustments.

1. Adjust C147 and C151 for maximum audio.
2. Adjust T101, 102, 103 and 104 for maximum. Adjust C102, 105, 107, 116, 119, 147, and 151 for maximum. Repeat these adjustments until no further improvement is noted.

6.8.1.7 R126 SELECTION (Note: R126 should be selected whenever the detector, Q103, has been replaced).

A. Connect audio voltmeter to TP1 (yellow test point) adjust 232A generator to 700 microvolts. Reduce RF level until audio has decreased 3db. This shall be less than 30 microvolts RF input. (Hard μv)

B. If Step A is met, proceed to Section 6.8.1.8. If Step A is not met, proceed to Step C of this Section, 6.8.1.7.

C. Connect DC voltmeter to TP2 (green test point) and set on 15VDC scale.

D. AGC quiescent voltage with no signal input will be approximately +1.5VDC. With decade resistance box or alternate methods replace R126 starting at 6.8K resistance. Reduce resistance in 5% steps until AGC abruptly changes. Note this resistance and install next 5% larger value of resistor that does not affect AGC quiescent voltage.

E. Repeat Step A.

6.8.1.8 CENTERING, DEFLECTION AND FLAG ADJUSTMENTS

A. Recheck modulation levels on 232A generator (40% at 90Hz and 150Hz). Adjust RF level to 700 microvolts.

B. Set tone ratio to 0db and adjust R200 for 0 on test fixture deflection meter.

C. Set tone ratio to 2db 150Hz over 90Hz and adjust R194 for 78μa on deflection meter.

D. Due to interaction of controls, repeat steps B and C until readings are correct.

E. Set tone ratio to 2db 90Hz over 150Hz and check that deflection is 78 ±3μa.

F. Adjust R211 for 325μa on test fixture flag meter. Readjust R194 and R200 if necessary.

G. With tone ratio set at 2db 150Hz over 90Hz slowly decrease RF generator level until 60% of 78μa is obtained (47μa). RF level shall be less than 30 microvolts.

6.10 TROUBLESHOOTING

Figure 6-2 is a troubleshooting flow chart designed to aid the technician in localizing malfunctions in the Glideslope Receiver.

As a further aid, Table 6-1 is a list of possible problem indications together with their associated causes and remedies.

Figure 6-3 illustrates certain waveforms which are necessary for proper operation of the receiver.

Malfunctions are most easily located using these aids together with the schematic diagram and nominal operating voltage overlay.

TABLE 6-1 TROUBLESHOOTING SEQUENCE TABLE

INDICATION	PROBABLE CAUSE	REMEDY
Entire unit inoperative	No A+ voltage	Check interconnect
+10 volt regulator output incorrect	R222 misadjusted	Adjust R222
	+10 volt line shorted	Check for shorts
	Defective regulator	Check Q110, Q111, and associated components.
Low sensitivity on all channels	Receiver improperly aligned	Align receiver
	Defective first mixer	Check Q101 and associated components
	Defective second mixer	Check Q102 and associated components
	Defective first oscillator, buffer or tripler	Check Q104, Q105 and Q106 and associated components
	Defective second oscillator or buffer	Check Q107, Q108 and associated components
	Defective I. F. amplifiers	Check I101, I102, and associated components
Low sensitivity on certain channels	Crystal(s) not properly switched	Check frequency selector interconnect
		Check crystal selector logic.

TABLE 6-1 TROUBLESHOOTING SEQUENCE TABLE (Continued)

INDICATION	PROBABLE CAUSE	REMEDY
		Check crystal switching diodes, CR103 through CR112 and CR153 through CR156.
	Defective crystal(s)	Replace crystal(s)
Deflection and flag vary excessively with changes in RF input level	Defective AGC	Check I103 and associated components
Upward deflection only	90Hz channel defective	Check I104A, I105A, and associated components
Downward deflection only	150Hz channel defective	Check I104B, I105B, and associated components
Excessive or insufficient flag and deflection	Deviation converter misaligned Incorrect number of internal and/ or external loads in use	Align deviation converter Check interconnect: 3 deviation loads, 2 flag loads
No flag deflection correct	CR171 or CR184 shorted CR170 open	Replace
No deflection, Flag correct	CR172 or CR173 shorted	Replace

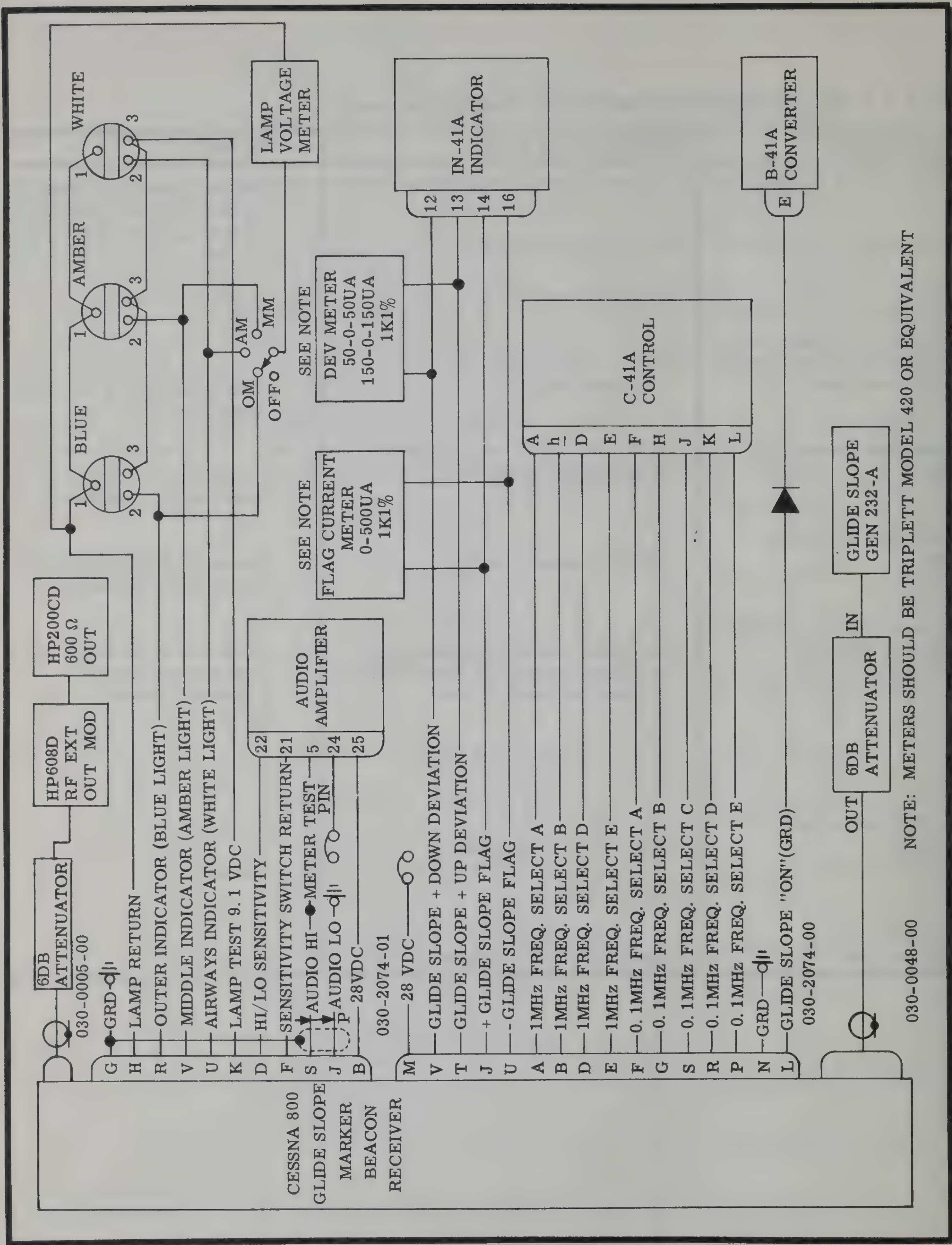


FIGURE 6-1 CESSNA 800 GLIDESLOPE/MARKER BEACON RECEIVER
TEST SET, SCHEMATIC DIAGRAM

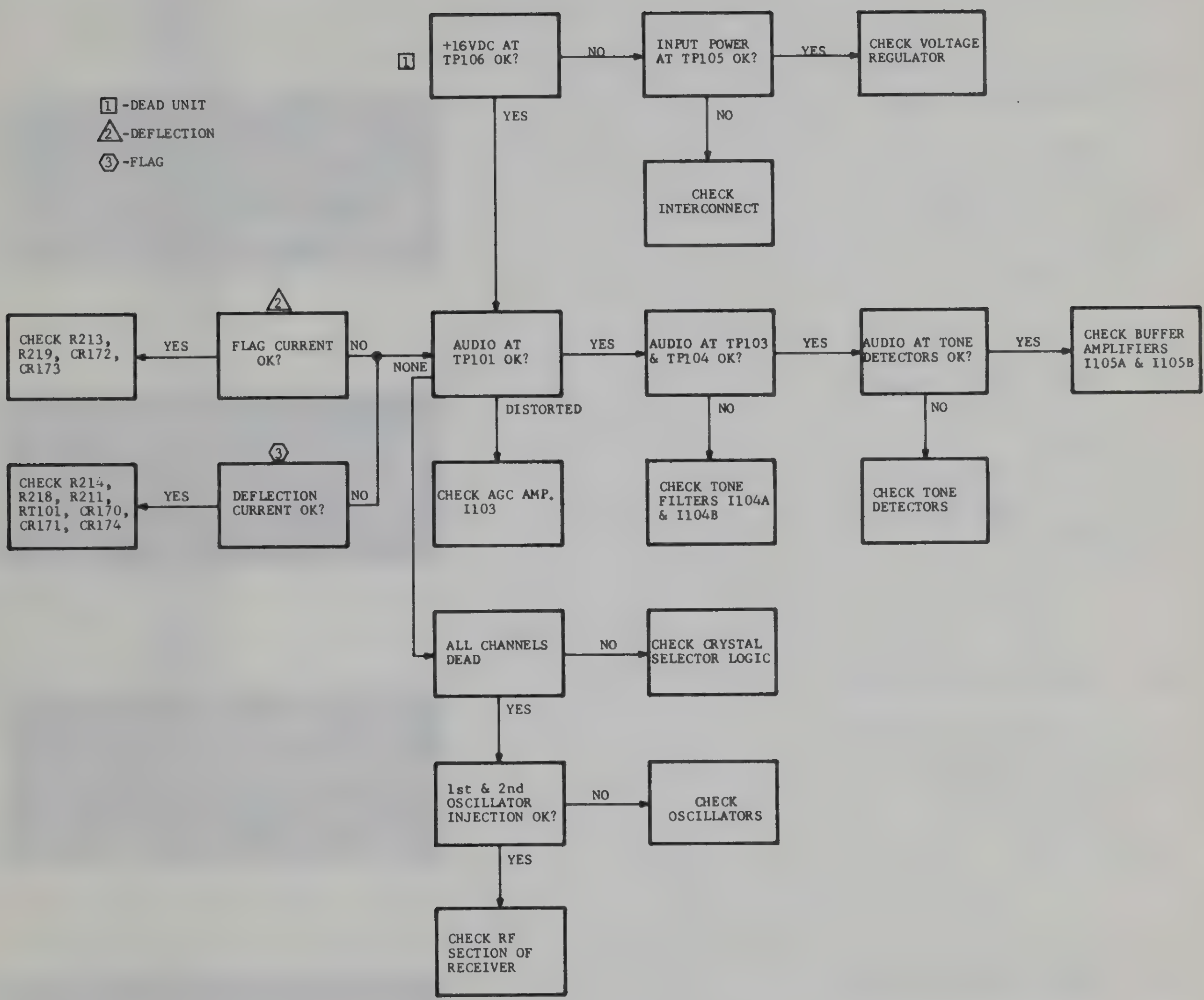
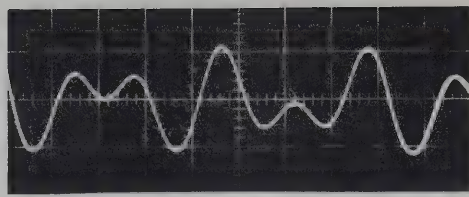


FIGURE 6-2 GLIDESLOPE TROUBLESHOOTING FLOW CHART

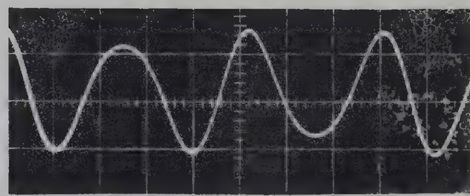
A. Detector Output

TP: 101
Vert: 0.5 volt/div
Horiz: 4 msec/div
Coupling: AC
Sync: Line



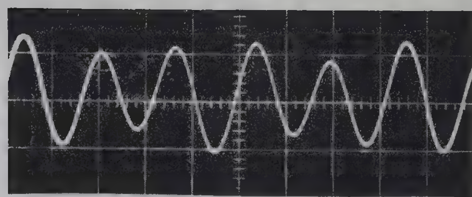
B. 90Hz Filter Output

TP: 103
Vert: 2.0 volts/div
Horiz: 4 msec/div
Coupling: AC
Sync: Line



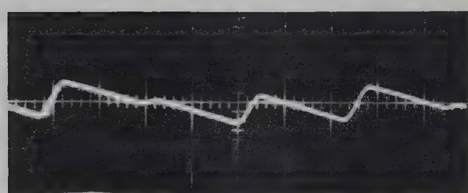
C. 150Hz Filter Output

TP: 104
Vert: 2.0 volts/div
Horiz: 4 msec/div
Coupling: AC
Sync: Line



D. 90Hz Detector Output

TP: Junction, C184-R208
Vert: 0.05 volt/div
Horiz: 5 msec/div
Coupling: AC
Sync: Line



E. 150Hz Detector Output

TP: Junction, C183-R199
Vert: 0.05 volt/div
Horiz: 5 msec/div
Coupling: AC
Sync: Line

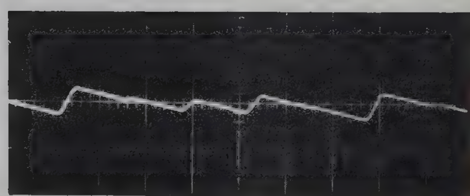
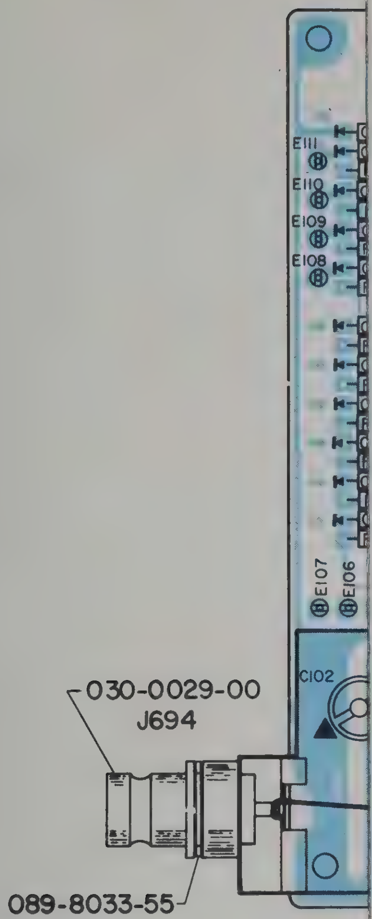
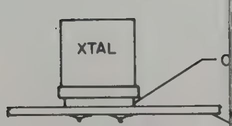


FIGURE 6-3 WAVEFORMS

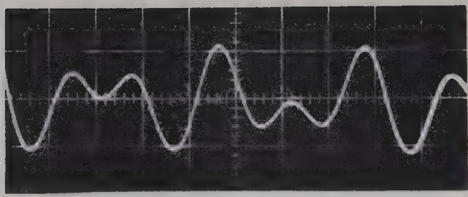




CRYSTAL MOUNTING

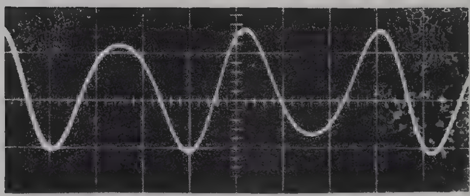
A. Detector Output

TP: 101
Vert: 0.5 volt/div
Horiz: 4 msec/div
Coupling: AC
Sync: Line



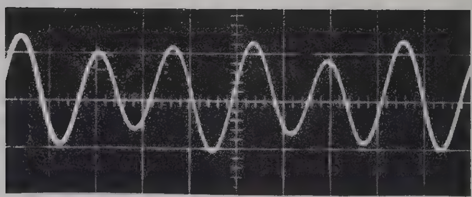
B. 90Hz Filter Output

TP: 103
Vert: 2.0 volts/div
Horiz: 4 msec/div
Coupling: AC
Sync: Line



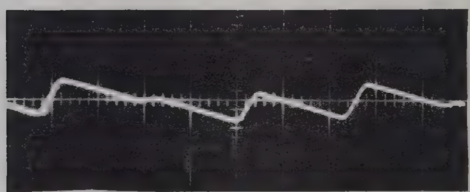
C. 150Hz Filter Output

TP: 104
Vert: 2.0 volts/div
Horiz: 4 msec/div
Coupling: AC
Sync: Line



D. 90Hz Detector Output

TP: Junction, C184-R208
Vert: 0.05 volt/div
Horiz: 5 msec/div
Coupling: AC
Sync: Line



E. 150Hz Detector Output

TP: Junction, C183-R199
Vert: 0.05 volt/div
Horiz: 5 msec/div
Coupling: AC
Sync: Line

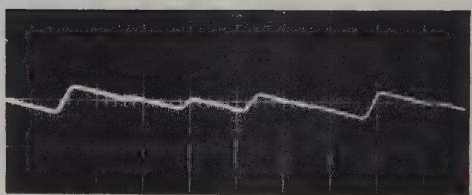
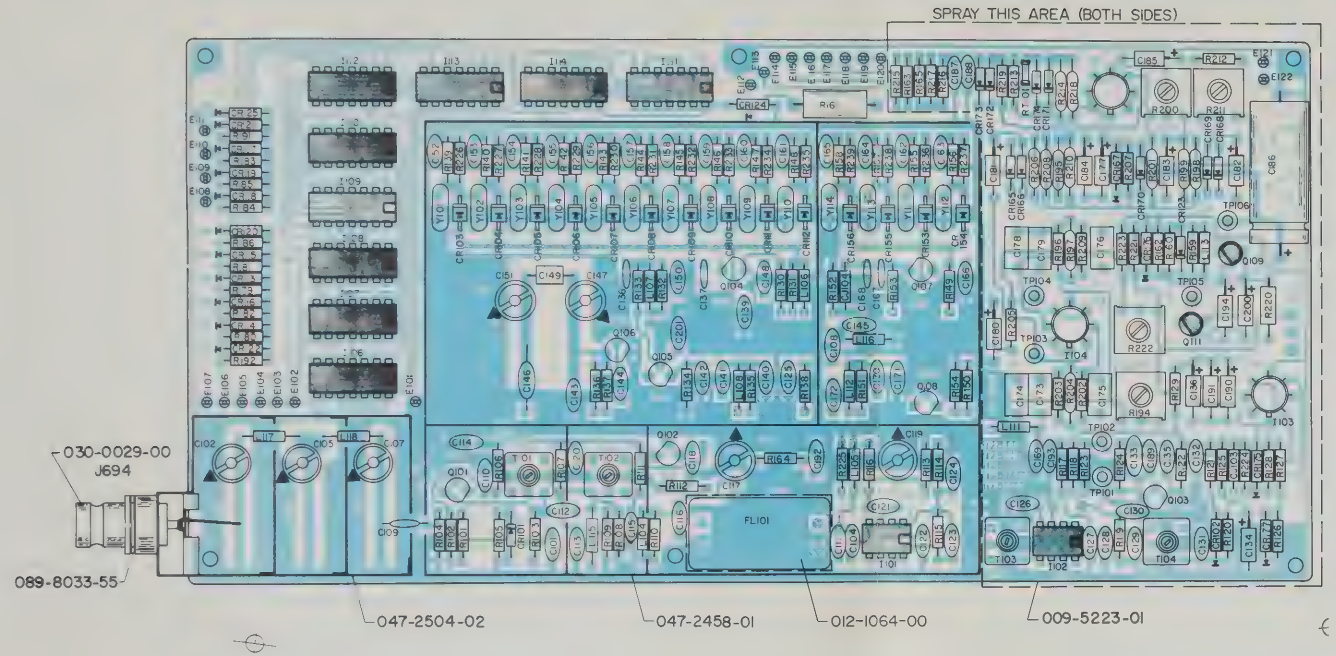
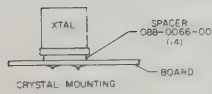


FIGURE 6-3 WAVEFORMS





CRYSTAL MOUNTING

NOTES

1 FOR COMPONENT VALUES, SEE BILL OF MATERIAL 200-0403-00
2 BOARDS MUST BE FREE OF FLUX AND OTHER FOREIGN PARTICLES AFTER ASS'Y IS COMPLETED RECOMENDED CLEANING PROCEEDURE: UTILIZING A SHALLOW PAN (APPROX. 1 1/2" DEEP) AND APPROX 1 PINT OF FLUX MANUFACTURES' RECOMMENDED FLUX REMOVER, SCRUB BOTH SIDES OF CARD THOROUGHLY WITH SOFT BRISTLED BRUSH DRY THOROUGHLY WITH AIR BLAST
3 SOME TRACES OF FLUX AND REMOVER MAY REMAIN AS A WHITE RESIDUE
4 ALIGN ARROWS ON C102, C105, C107, C117, C119, C147, C151 WITH ARROW ON BOARD.
5 APPLY GLYPTAL TO CONNECTOR THREADS BEFORE ASS'Y.
6 MASK VARIABLE RESISTORS R194, R200, R211, R222, TRANSFORMERS T103 & T104, MOUNTING HOLES BOTH SIDES, & ALL TEST POINTS; THEN EVENLY SPRAY PORTION OF BOARD ENCLOSED BY DASHED LINES WITH CLEAR URETHANE SEAL COATING (016-1040-00) AFTER CLEANING. COATING IS 95% CURED AFTER 48 HOURS AIR DRYING OR OVEN DRYED AT 150°F FOR 24 HOURS. COATING TO BE THICK ENOUGH TO SEAL SURFACES BUT FREE OF RUNS.

TEST POINT LIST

TP NO	PART NO.	COLOR
1	010-0022-07	YEL
2	010-0022-04	GRN
3	010-0022-12	VIO
4	010-0022-13	GRY
5	010-0022-02	RED
6	010-0022-06	ORN

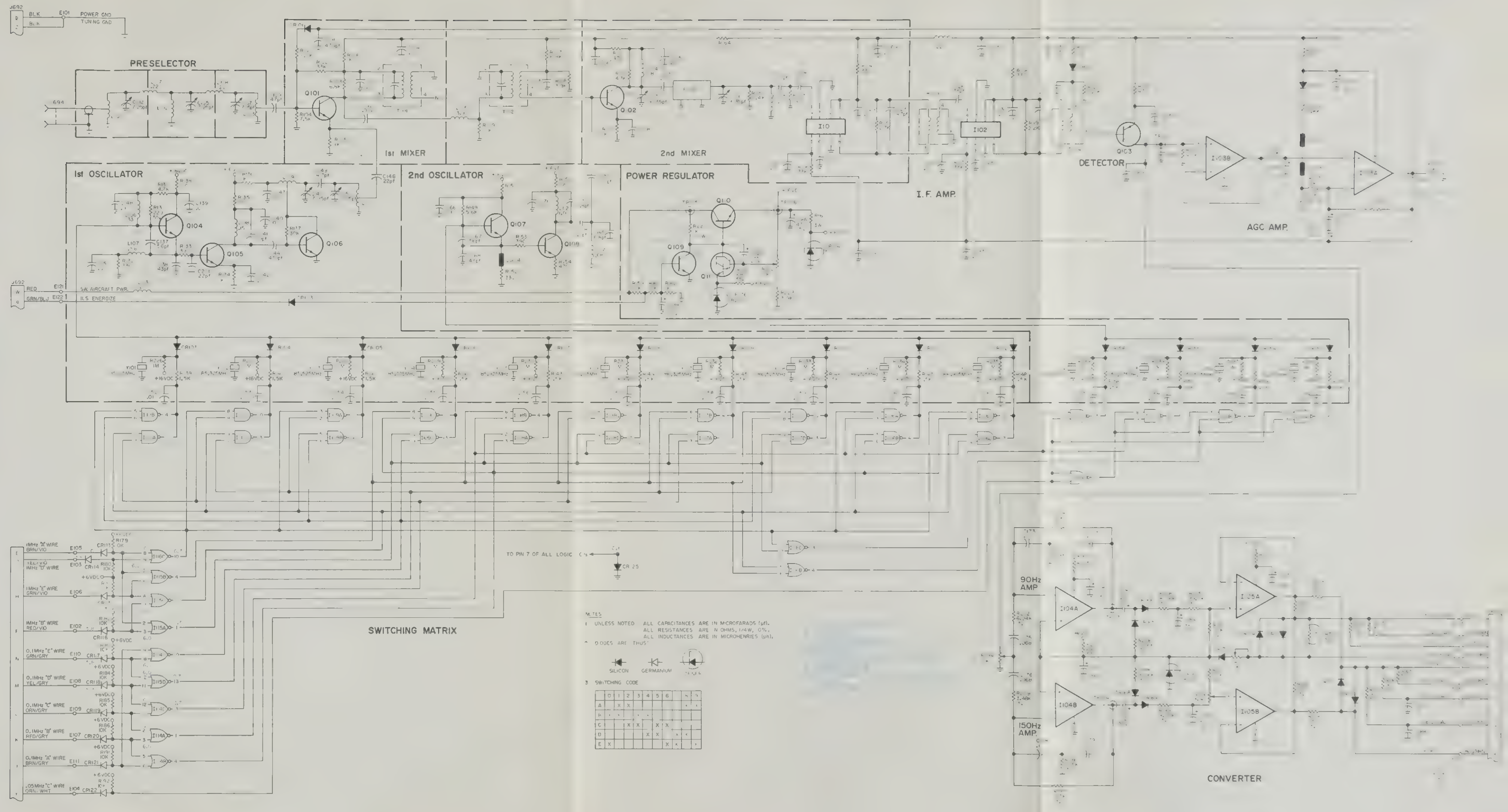


FIGURE 6-4 GLIDESLOPE RECEIVER SCHEMATIC AND ASSEMBLY

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